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Fish and Game Commission

QUARTERLY REPORT

April - June 1952

Wildlife Restoration Division

PITTMAN-ROBERTSON FEDERAL AID PROJECT

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Helena, Montana
July 15, 1952

Regional Director
Fish and Wildlife Service
Swan Island
Portland 18, Oregon

Dear Sir:

We are herewith submitting a Quarterly Progress Report in connection with the projects carried out through the use of Federal Aid in Wildlife Restoration funds.

The coverage is for the period April, May and June, 1952.

Submitted by:

Robert F. Cooney
Robert F. Cooney, Director
Wildlife Restoration Division

Approved by:

R.H. Lambeth
R. H. Lambeth
State Fish and Game Warden

QUARTERLY PROGRESS REPORT

For The

WILDLIFE RESTORATION DIVISION

STATE OF MONTANA

FISH AND GAME COMMISSION

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Chief Deputy - W. J. Everin

Director, Wildlife Restoration Division - R. F. Cooney

Volume III Number II

April, May and June, 1952

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STATE Montana
PROJECT NO. 1-R-11 (Eastern)
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR
INVESTIGATIONS PROJECTS
As Required By
FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Wildlife Survey and Management (Eastern)

2. Leader: Don L. Brown, Biologist
   Robert J. Fischer, Jr. Biologist
   Joe L. Egan, Jr. Biologist

3. Report of Progress:

Work Plan I: Antelope Census, Herd Production, Migration and Mortality Studies.

Job 1-A: Antelope Census
Spring Census Report Attached

Job 1-B: Antelope Herd Production Studies
Proceeding

Job 1-C: Study of Antelope Migration and Population Shifts
Proceeding

Job 1-D: Study of Antelope Losses by Hunting and Natural Causes
Proceeding

Synopsis

During the past year an antelope strip census, i.e., strips flown 12 mile intervals in both east-west and north-south directions, was conducted in the Chouteau, Yellowstone, Musselshell, Missouri Breaks, Custer, Glendive, and Carter units. For comparison, parts of several of the above units were surveyed by complete coverage, i.e., strips flown at intervals of one mile or less.

Strip census, using strips in a north-south direction only, at 12 mile intervals, was flown in the Sweetgrass Hills, Hill, Blaine, Phillips, Glasgow and Missouri Breaks units, in conjunction with the annual waterfowl nesting ground survey.

Strip census, using strips at six mile intervals, north-south direction only, was flown in the Yellowstone, Musselshell, Fergus and Missouri Breaks units.

Results of the above strips, when compared with areas of total coverage, are favorable; refinement of technique is necessary before any definite conclusions can be drawn.

Information concerning herd production, migration and mortality will fall into place by comparing results of former and subsequent counts.

Information to date indicates an annual increase of over 50% for most areas and a loss (other than hunting) of from eight to twenty percent. Evidence points to the possibility that each of the major antelope ranges has a different increase and mortality (other than hunting) rate, which remains fairly constant within each area. It may be possible to associate this with climatic conditions and/or available forage.

Work Plan II: Relationship of Antelope to Agriculture and Range Land Use
Job II-A: Relationship of Antelope to Winter Wheat Production
Proceeding

1. A brief inspection of the winter wheat enclosure was made in June to determine the condition of the fence and whether or not antelope were feeding in the area. The fence was in good shape, fenced area had been sprayed with 2-4D, as had the rest of the field for weed control. Very few antelope were feeding in the immediate vicinity of the enclosure at the time of inspection.

Job II-B: Relationship of Antelope to Seed and Feed Alfalfa
Proceeding

1. Inspection made in June revealed the alfalfa enclosure fence had been down for some time and that the cooperating rancher was anxious to have it completely removed. Removal was accomplished several days later.

Job II-C: Collection and Analysis of Antelope Stomachs
Proceeding

1. Stomach samples are being collected bi-monthly.

Synopsis

This project has not progressed satisfactorily due to circumstances beyond our control. The alfalfa enclosure suffered severe hail storm and flood damage; consequently very little data were obtained. In addition, the biologist assigned to this project resigned to take another job and a replacement has not been found.

The possibility of assigning this project to a Junior Biologist, assisted by a graduate student, is being studied.

Antelope stomach samples are being collected bi-monthly on this project; some of the samples have been shipped to the California Fish and Game laboratory for analysis.

The usual number of inspections of antelope damage was made during the past year. In come cases "aerial hazing" was successful in holding them off for a brief period. In all cases it was suggested the field being damaged be fenced with hogwire or six strands of barbed wire, which, if kept up and tight, is the only successful method for holding antelope.

Work Plan III: Deer Food Habits Study on Badland Type Range

Job III-A: Important Food Plants Used by Deer in Badlands

Job III-B: Evaluation of Range Conditions and Degree of Use in Key Species

Synopsis

An intensive range survey of the Fort Peck Game Range, is being conducted by the Fish & Wildlife Service and the Bureau of Land Management. In view of this, it was deemed advisable to interrupt Jobs III-A and III-B in order to make use of the very valuable information they will obtain.

Job III-C: Population Studies of Deer (Missouri River Breaks)

Synopsis

Pre and post-season aerial sex and age ratio counts of mule deer, and a subsequent ovarian analysis, were accomplished for the Missouri River Breaks deer herd.

Pre-Season	Post-Season	Ovarian Analysis
B/D 1:1.16	1:2.60	
D/F 1:1.25	1:1.25	1:1.21

The above results, based on 519 mule deer in the pre-season count and 470 in the post-season, led us to the conclusion that aerial sex and age ratio counts are more accurate than ground counts. Total populations were computed with formulas developed by George H. Kelker, using harvest and sex ratio data.

Due to the large and apparently accurate sex ratio sample taken, this should be a very valuable method for determining total populations in this type of range. It is doubtful if aerial sex ratio checks on deer will ever be successful in heavily wooded areas.

Work Plan IV: Mule Deer Food Habits on Grassland Type Range

Job IV-A: Mule Deer Food Habits on Grassland Type Range

1. General inspection of deer ranges along the foothills of the mountains revealed some overuse of juniper. However, until a food habits study of deer on these ranges is made, it will be difficult to determine whether or not deer are over-using their range. It is hoped that a co-operative agreement between Fish & Game Department and the Forest Service will get this project under way in more detail.

Job IV-B: Population Studies (Little Belt Mountains)

Synopsis

One hundred deer of either sex were removed from the Judith River area due to severe economic conflict, i.e., oats, alfalfa and haystack damage. Ovarian analysis from does shot in this area, made by the Cooperative Research Unit, showed that each doe produced 1.34 fawns in the spring of 1951.

Work Plan V: Census and Survey of Deer Herds in Eastern Montana
Progress report attached

Synopsis

General range surveys and damage complaint inspections, led to special permit seasons in the Powder River, Little Belt, Poplar, Phillips and Fergus units. Following the season, permit holders were sent questionnaires to obtain kill data. Cooperation was very good and the following results were obtained.

No. Permits	Area	% Successful	Ratio B/D Killed
150	Bay Horse	95	1:1.25
150	Culbertson	92	1:1.43
300	Ft. Peck Game Range	91	1:1.25
30	Martinsdale	100	1:2.20
100	Utica	90	1:2.95

It was interesting to note that the white tail deer hunters (Culbertson) were as successful as the mule deer hunters, (all others).

Work Plan VI: Study of Introduced Mountain Sheep Herds in Badlands
Progressing

1. Routine inspections from time to time are made on these sheep. Those within the pasture can be closely checked but those outside are difficult to find.

Investigations reveal there are 28 bighorns still in the enclosure. The fact that twelve mature ewes produced only six lambs will bear further investigation.

Work Plan VII: Census and Survey of Elk Herds in Eastern Montana

Job VII-A: Census and Survey of Established Elk Herds
Job Completion report attached

Synopsis

All of the established elk herds, except those in the Bear Paw Mountains, were censused during the past year with the following results:

Little Belt Mountains		
Judith River	756	
Musselshell River	318	
Total	1074	
Castle Mountains	208	
Highwood Mountains	435	
Judith Mountains	58	(incomplete)

Special permits were issued in three areas and card returns indicate results as follows:

No. Permits	Area	% Successful
30	Dunkel Ranch (Little Belt Mountains)	62.5
75	Highwood Mountains	53.3
15	Judith Mountains	33.3

Job VII-B: Investigation of Recently Introduced Elk Herds

1. Missouri River Breaks elk were periodically checked by aerial survey throughout the past year. Most of them have remained in the area they were planted, and a good calf crop was noted for the first year.

2. Pine Ridge. This was recognized as being a troublesome elk habitat (economic conflict) and an attempt was made last fall to control this plant. The thirty-five permit holders sent into the area failed to kill any elk.

Two aerial checks made in this area failed to tabulate a single elk; however, ranchers report the elk are still present.

3. Rock Creek - No investigation

4. Knowlton - No investigation

Submitted by:	Approved by:
Name Don L. Brown	Montana State Department of Fish & Game
Title Biologist	By: Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 1-R-11 (Eastern) Work Plan No. I Job No. 1-A

Title of Job: Aerial Antelope Census

DATE: April, May, June

PERSONNEL:

Raleigh Shields - Deputy Game Warden
Asa Rogers - Deputy Game Warden
Bob Fischer - Jr. Biologist
Wynn Freeman - Sr. Biologist
Don L. Brown - Biologist

PURPOSE:

This report is a continuation of the work started a year ago on the development of census techniques for antelope that are less time consuming than total coverage counts. (See Quarterly Report; Jan.-Mar. 1952)

PROCEDURE:

Last year strips were flown at 12 mile intervals in east-west and north-south directions forming a grid-like pattern over the units surveyed. This proved inadequate due to the time wasted flying between strips. Also it was found that visibility was impaired when flying toward the sun. Thus, another system, in which the strips were flown at 6 mile intervals in a north-south direction only, was instituted. The survey was conducted during the early morning and evening hours when the antelope were active and more conspicuous, also visibility is improved when the sun's rays strike the antelope from a lower angle.

The Fish and Game Department plane, a Piper Cub 105, was used on this survey. The average flying altitude was less than 100 feet with 3/4 of a mile being observed on the down-sun side and 1/4 mile looking into the sun. In this way the visibility was very good and the tally was more comprehensive. Both the pilot and the observer made observations with the latter doing the recording. Antelope were recorded as bucks, does and unclassified (see attached form). Each management unit was surveyed before the 1952 fawn drop; thus, for computing hunting season populations an estimated increase was added. Strips are computed on the basis that all of the antelope within a square mile were observed, i.e. strip width one mile.

*Hi-line and Northern Missouri Breaks survey was at 12 mile intervals; statistical validity to be tested.

FINDINGS:

The flight strips and boundaries of each unit; miles flown and number of antelope counted are illustrated on the maps. Table I shows the number in each unit and also the antelope per square mile found in these respective units. Table II relates antelope classification and the buck-doe ratio in the censused areas.

TABLE I

Area	Strip No.	Strip Interval	Antelope	Strip Miles	Antelope (1 Sq.Mi.)	Total Area Sq.Mi.	Total Antelope (computed)
Musselshell Unit	21	6 mile	1532	556	2.76	3417	9431
Fergus Unit	10	6 mile	496	402	1.23	3123	3841
Missouri Breaks & Custer Units	4	6 mile	536	125	4.29	721	3097
Missouri Breaks Unit (North Garfield)	6	12 mile	133	148	.90	1645	1481
Yellowstone Unit	15	6 mile	1600	488	3.28	2934	9624
Blaine, Phillips, Glasgow Units (North Half)	19	12 mile	206	738	.28	7884	2207

TABLE II

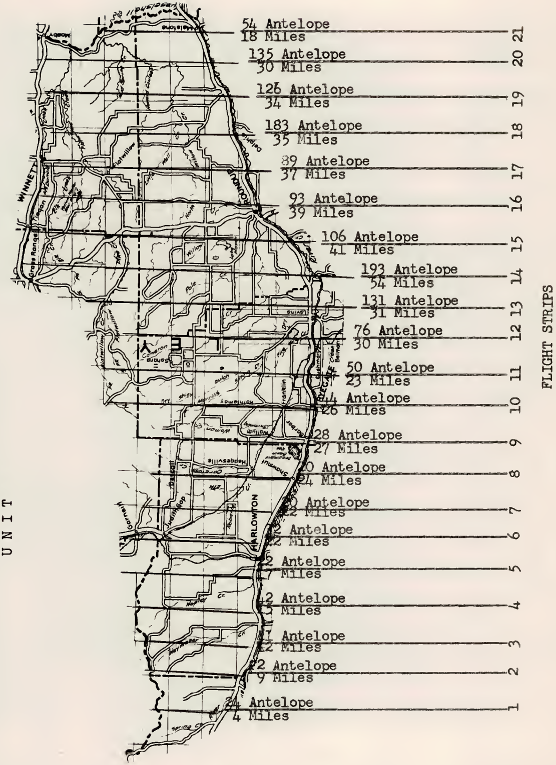
Area	Antelope				Sex Ratio
	Uncl.	Bucks	Does	Total	B/D
Musselshell Unit	925	266	341	1532	1:1.28
Fergus Unit	178	76	242	496	1:3.20
Missouri Breaks & Custer Units (Musselshell Drainage)	341	75	120	536	1:1.60
Missouri Breaks Unit (North Garfield)	89	11	33	133	1:3.0
Yellowstone Unit	1144	170	286	1600	1:1.68

CONCLUSIONS & RECOMMENDATIONS:

The overall value and meaning of these flight strips cannot be determined until comparison with complete coverage counts, hunter harvest, and other surveys, both preceding and subsequent to this one is accomplished.

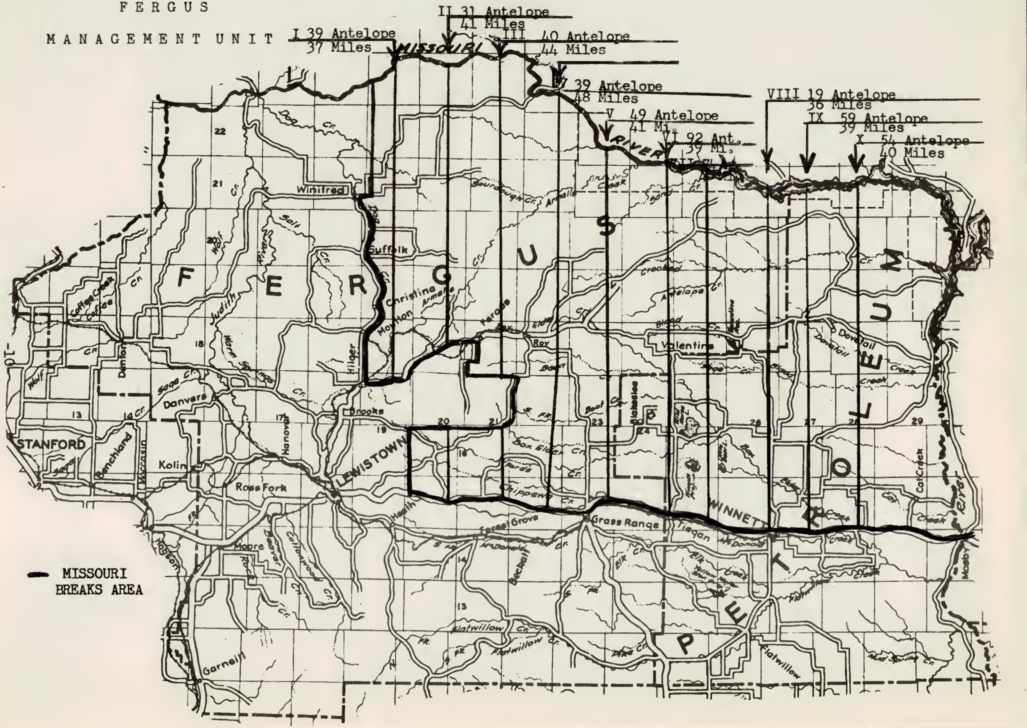
Eventually, enough data will be at hand to determine statistically, the degree of accuracy with various strip intervals. Until that time, the job will be a problem of technique; afterward, if developed, it could be a valuable population inventory and management tool.

MUSSELSHELL MANAGEMENT UNIT



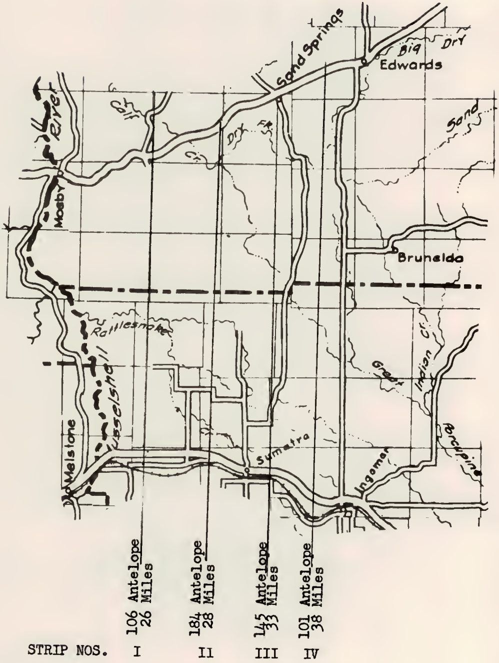
FERGUS

MANAGEMENT UNIT



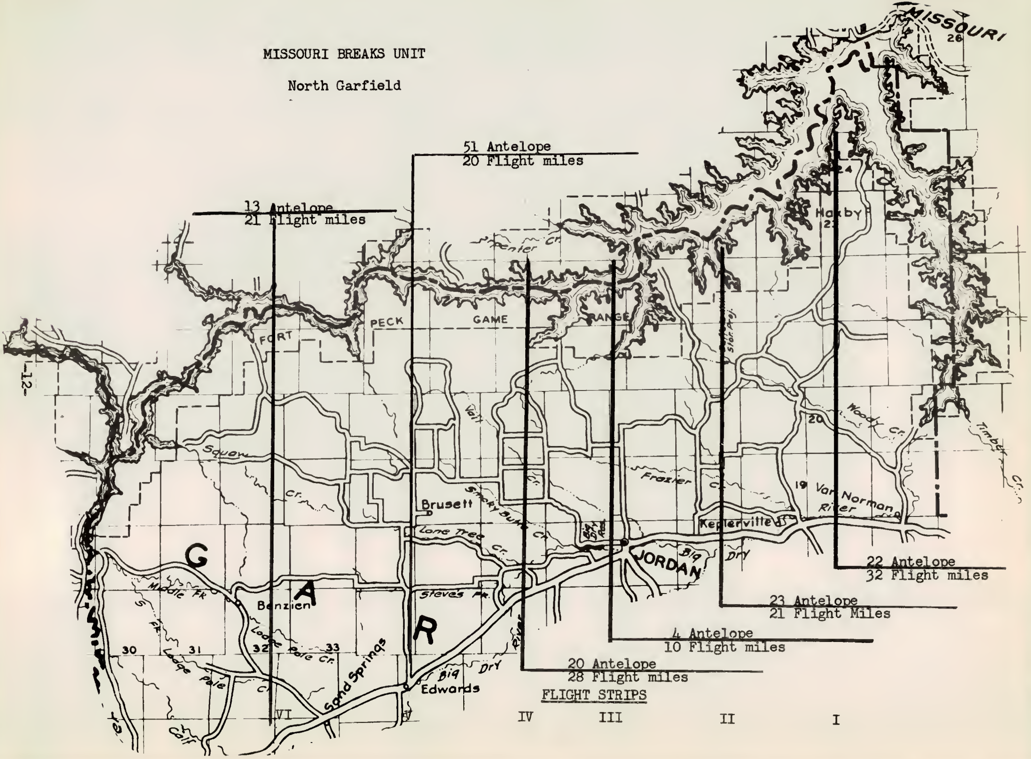
MISSOURI BREAKS and CARTER UNITS

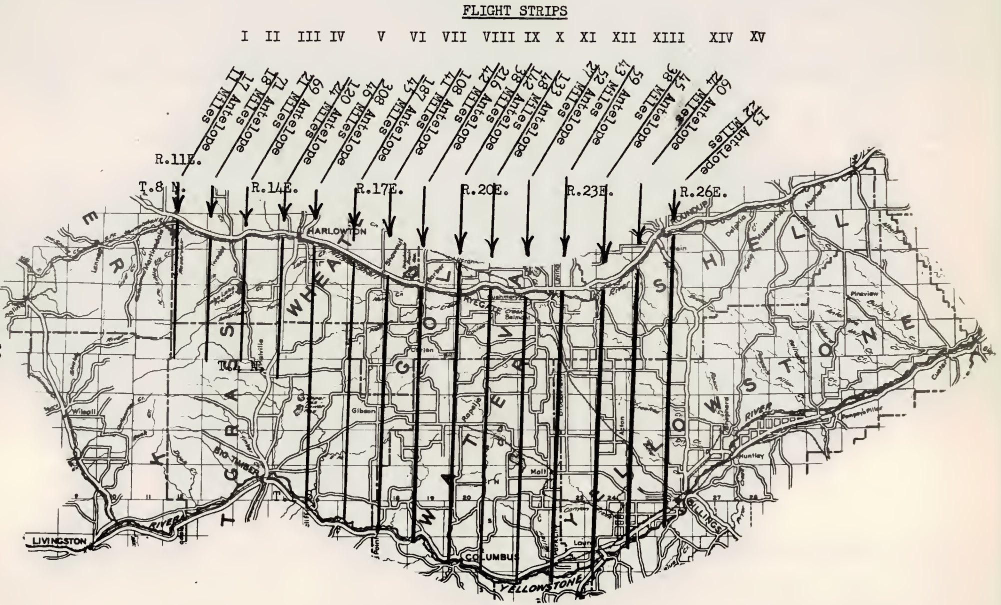
Musselshell Drainage



MISSOURI BREAKS UNIT

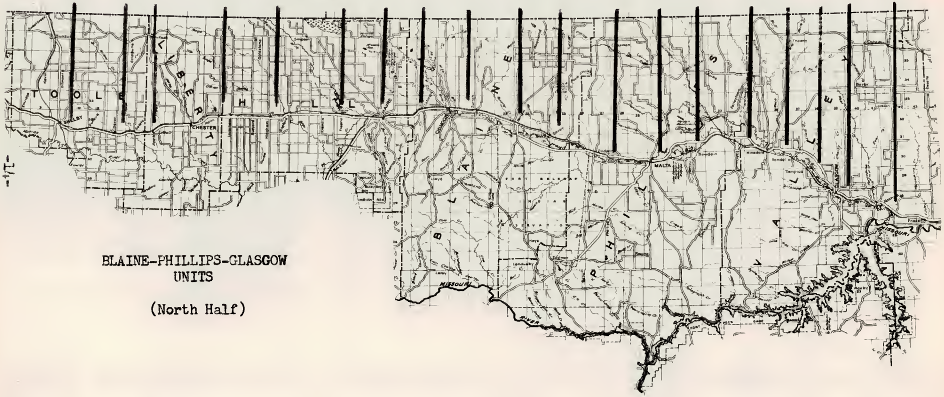
North Garfield





YELLOWSTONE MANAGEMENT UNIT

Antelope	1	23	16	0	1	1	4	3	9	29	12	7	34	20	3	3	19	10	1
Fl. Mi.	36	37	37	32	31	32	32	30	30	30	34	39	44	45	38	41	48	58	66
Strip No.	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1



BLAINE-PHILLIPS-GLASGOW
UNITS

(North Half)

The attempt to count antelope and waterfowl on the same flight was not entirely successful. At times the waterfowl were numerous enough so that no time could be devoted to antelope. Thus, if it is desirable to combine the surveys in the future, it is recommended a four place plane be used so that two men may concentrate on waterfowl and two on antelope.

These strips, even though they may eventually be without value in accurately determining antelope populations, do provide the best available base from which to determine a hunter harvest.

Evaluation of the results of the Musselshell Unit strip census will be made upon completion of the complete coverage survey for the same unit.

Submitted by:	Approved by:
Name Don L. Brown	Montana State Department of Fish and Game
Robert J. Fischer	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

JOB PROGRESS REPORT

INVESTIGATIONS PROJECTS

State Montana

Project No. 1-R-11 (Eastern) Work Plan No. VI Job No. VI-A

Title of Job Billy Creek Mountain Sheep Recheck

DATES:

May 20 to 23
June 26 and 27

PERSONNEL:

Cliff Wolf - Fort Peck Game Range
Claire Aldous - Fort Peck Game Range
Asa Rogers - Deputy Game Warden
J. L. Egan - Jr. Biologist
Bob Fischer - Jr. Biologist

INTRODUCTION:

On November 16, 1947 under project 22-A, an 8-foot woven wire fence was built surrounding 328 acres of combination pasture and badlands terrain, on Billy Creek in the Missouri Breaks, (N.W. Garfield County). Sixteen bighorn sheep from Colorado's Tarryall herd were released in this enclosure to re-establish a sheep herd in the Missouri Breaks where the Audubon sheep once existed.

In 1949, fifteen of the 32 sheep escaped from the enclosure through a hole in the fence. More have escaped since and the number is estimated to be 15 or 20 head--making a total of 30 or 40 sheep in the surrounding Breaks.

PURPOSE:

The purpose was to conduct a census of the herd--especially the lamb crop--check mortality and winter use of range, and to inspect water facilities and fences.

PROCEDURE:

The entire area within the enclosure was covered on foot three times in three consecutive days during May and twice more in June. Sexing and ageing was conducted and it is felt that a fairly accurate analysis was concluded.

Two waterholes were dynamited to remove the silt which sifted into them from the neighboring slopes.

The entire enclosure was surveyed with respect to range condition, lambing, predation, and dead sheep.

FINDINGS:

The 28 sheep observed within the enclosure were classified as follows: Eight rams, of which two were yearlings, and the others being two and three years old - none having horns with a complete curl; twelve mature ewes; two yearling ewes and 6 lambs. The June check revealed that lambing was complete and that only six lambs were present.

Six rams and one ewe were seen on the outside near the fence. Three of these six rams were four or more years old, for they carried horns with complete curls.

Three breaks were found in the fence, two of which were on the East side and one on the Northwest side near the spring. This spring is outside the enclosure and supplies a small amount of water for the bighorns, and it was found to be used moderately. The other and main water supply is from two water holes located in a deep gorge on the East side of the pasture. Silt from the steep banks sifts into these water holes and gradually fills them, making the use of dynamite to remove this silt a very practical procedure. Sheep sign was observed around these water holes before blasting and also during the June check, indicating that this water supply is readily utilized and must be kept available to the sheep at all times.

No signs of predation or predators was found within the enclosure. The bleached skeletal remains of a young sheep were found in a deep coulee. The death was estimated to have occurred at least a year ago.

The North and East sides of the pasture were well utilized and the ground disturbed in several places. Feeding seemed to have occurred here to a greater extent than on the south and west sides. The range on the south and west sides is in good condition and can hardly be distinguished from that on the outside of the enclosure. Yucca was utilized heavily, and the ridges and southern exposed slopes were also heavily foraged during the early spring months. The June check revealed good pasture throughout the enclosure and all the sheep in good to excellent condition.

Asa Rogers successfully eliminated the buck deer, which was trapped within the enclosure at the time of construction, by driving it through the open gate.

CONCLUSIONS:

1. The 28 sheep counted in the enclosure were usually found in three groups; the six mature rams in one bunch, the ewes with lambs in another and the yearlings and ewes without lambs making up the third bunch. The ewes and lambs had a tendency to bunch up. This is probably a natural outcome of their all having the same inclination to remain in the rougher terrain. In June, intermingling of ewes with lambs and ewes without lambs was observed, but the rams remained in a separate group. Precocity of the lambs was very obvious during our May survey. When the herd of ewes and lambs was approached, the lambs seemed more wary and were always the first to disappear over the ledge and were very often in the front portion of a retreating bunch.

2. Only seven sheep were observed on the outside of the enclosure during this survey but a flight over the area last winter revealed thirty-four. Neighboring ranchers report seeing sheep sign on upper Billy Creek, fairly far from the pasture.

3. For the past five years this herd has been very prolific and it is therefore rather conclusive that this area is a suitable habitat for the Rocky Mountain Bighorn.

4. Ridges and southern slopes were utilized heavily this past winter indicating that a reduction of the herd within the enclosure should be affected before the next winter.

5. A total of 28 sheep were tallied within the enclosure as follows:

   6 rams - none with horns fully curled
   2 rams - yearlings
   2 ewes - yearlings
   12 ewes - mature
   6 lambs - unclassified

The 1952 lamb crop numbers six. The above figures indicate that six mature ewes were without young this year. A thorough search of canyons and slopes did not reveal any lamb mortality. The 1952 increase for this control herd of 28 sheep was only 21% with only 50% of the mature ewes producing offspring. The reason for half of the mature ewes not producing offspring is unknown at present, although there are many possible explanations. Some possibilities are (1) a severe winter, however no mortality was observed, (2) overcrowding, (3) too many rams in the enclosure, although this is a point of conjecture.

RECOMMENDATIONS:

1. As long as the pasture is maintained the water holes should be opened at least once a year.

2. A winter range utilization survey was not conducted, but the present condition indicates extensive use of ridges and south slopes, and of yucca. It is therefore recommended that a herd reduction within the enclosure be conducted before the next winter season.

3. It is also believed that the bighorns have established themselves in sufficient numbers to maintain themselves and produce an annual increase without further use of the enclosed pasture.

Submitted by Robert J. Fischer   Approved by Don L. Brown

Date July 15, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 1-R-11 (Eastern) Work Plan No. VII Job No. VII-A

Title of Job: Census & Survey of Established Elk Herds

PERSONNEL: Don L. Brown, Biologist
Donald E. Johnson, Jr. Biologist

OBJECTIVES:

1. To determine the population of established elk herds in Eastern Montana.
2. To test census techniques as applied generally to elk and specifically to the herds of each of the mountain ranges listed.

PROCEDURE:

All counts were made with the Fish and Game Department airplane, a 105 Super Cub. The most reliable data were obtained in the early morning while elk were still on the feeding grounds. By preliminary scanning from high altitudes, large areas unmarred by tracks were omitted. In each area the entire mountain range was covered, but only when elk or tracks were observed was a thorough search made.

On several occasions the survey was called off due to inclement weather or because the elk were in the timber. When this occurred, the partial count was disregarded, as to the total, in the final analysis. Only when it was possible to count all of the elk in the entire area, was the count used. This eliminated any possible duplication due to movement of elk during the night.

Some attempt was made to segregate the bulls but due to large concentrations, this was incomplete.

Only those elk actually seen were tabulated and it is believed these counts are within 5% of the total population. There were very few instances of elk signs where no elk were observed, thus no estimates are given.

FINDINGS:

Little Belts Unit

Judith River Drainage 3-7-52

Table 1

Area	Total Elk	Bulls
Waite Creek	2	2
Browns Gulch	6	1
Indian Hill	10	1
Beldon Flats	3	-
Middle Fork R.S.	12	2
Middle Fork R.S.	12	-
Sutter Field	115	Not Sexed
" "	26	" "
" "	163	" "
" "	228	" "
Woodchopper Ridge	3	3
Kelly Field	96	Not Sexed
Green Mountain	38	1
Sage Creek	4	4
Dry Wolf	38	1
Total	756	15*

Table 2

Musselshell Drainage 3-3-52

Area	Total Elk	Bulls
Middle Fork Hopley Cr.	15	Not Sexed
West Fork Hopley Cr.	5	5
Morrissey & Trombone Creeks	85	Not Sexed
" " "	67	" "
" " "	24	" "
" " "	20	" "
Nevada Creek	18	" "
Morris Hill	30	" "
Baxter Creek	54	" "
Total	318	5*

Table 3

Castle Mountains 3-17-52

Area	Total Elk	Bulls
Head of Checkerboard Cr.	12	0
" " " "	49	Not Sexed
" " " "	65	" "
" " " "	69	" "
So. Fork of Musselshell	2	2
" " " "	8	8
" " " "	3	3
Total	208	13*

* Does not indicate all of the bulls in the herd.

Chouteau Unit

Table 4

Highwood Mountains 2-29-52

Area	Total Elk	Bulls
Martin Creek	9	9
" "	17	17
Cottonwood Creek	15	15
" "	1	1
" "	8	-
" "	7	-
Stilwell Ranch	6	6
" "	2	2
" "	1	1
Scribner Ranch	43	4
" "	50	3
" "	13	4
" "	3	3
Postel Creek	45	Not Sexed
" "	39	" "
Shonkin Creek	30	" "
" "	48	" "
" "	26	" "
Bateman Ranch	2	2
" "	4	3
" "	27	Not Sexed
Big Coulee	19	" "
" "	11	-
" "	4	4
Belt Creek	5	1
Total	435	75*

Fergus Unit

Table 5

Judith Mountains

Area	Total Elk	Bulls
Armells Creek	32	16
Fergus Ranch	26	Not Sexed
Total	58	16*

The counts in the Judith Mountains were made at widely separated dates and there is some possibility of duplication. The results of this survey are not considered conclusive. Conditions were never conducive to making a complete census i.e., when a good snow cover was present, either clouds or turbulent air made it necessary to leave the mountains. In all, seventeen attempts were made to count these elk, but not one was completed.

* Does not indicate all of the bulls in the herd.

Three Year Summary

Table 6

Area	1950	1951	1952
Judith River	585	488	756
Musselshell River	307	309	318
Little Belt Total	892	797	1074
Castle Mountains	255	217	208
Highwood Mountains	282	132	455
Judith Mountains	80est.	-	58 incomp.

CONCLUSIONS AND RECOMMENDATIONS:

Little Belts Unit (Judith River)

The 1952 elk count was perhaps the most complete census to date; Waite Creek, Sage Creek and Dry Wolf Creek area which had not supplied any elk on former counts and was not intensively censused, accounted for 50 elk this year. Due to a predominance of females, caused by extensive bull hunting, the increase figures gathered from herds where either sex hunts are held, may not be applicable to this area.

It is recommended the herd be reduced by at least the estimated increase. It is assumed that a two day either sex elk season to be held on Oct. 15 and 16, 1952, with the remainder of the season Oct. 15 to Nov. 15, 1952, open to hunting branch antlered bulls plus the extended season will accomplish this.

A series of checking stations will be needed to determine the harvest during the two day either sex season in order to determine the kill needed during the extended season. Results obtained from these stations can be applied in future years to the management of this herd.

For the extended season (Nov. 16 - Feb. 28), it is recommended that elk of either sex be taken in the limited area until the balance of the estimated increase, other than killed during the regular season, are removed; the remainder of the extended season be limited to antlered bulls. The estimated harvest may have to be increased if conditions, i.e. deep snow and economic conflict, etc. warrant a further reduction.

It is further recommended the sanctuary boundary be altered to include the Yogo Road after January 31, 1953. This is to allow elk to forage further north unmolested.

Little Belts Unit (Musselshell River)

This area seems to winter approximately the same number of elk each year. A general shift of the main herd to the east is noticeable. This drift is very desirable from the standpoint of damage to range and economic conflict. If all of the elk wintering in the Musselshell Drainage would winter east of Haymaker Creek, where unused range is available, damage complaints would all but disappear.

A two day season on elk of either sex is recommended for this area, Oct. 15 and 16, 1952, and the balance of the season on antlered bulls. The extended season area to remain as last year, and the season on antlered bulls extend through Feb. 28, 1953.

Chouteau Unit (Highwood Mountains)

The very late and incomplete count made in 1951 which yielded only 132 elk created a lot of false impressions which will be hard to overcome in the management of this herd. It is believed there are enough elk to warrant a general open season for a limited period in this area but public opinion (both ranchers and sportsmen) demand special permits.

There is heavy use of this range by cattle and most of the elk winter on private property. This combination makes it necessary the herd be held in close check. Three hundred elk has been generally accepted as the number of elk desired on this range.

Table 7 Elk Kill Record for Highwood Mountains

Year	No. Permits Issued	Successful	%	Kill	
				Male	Female
1948	80 Bulls	56	70.13	56	0
1949	90 E.S.	57	63.33	31	26
1950	100 E.S.	81	81.0	40	41
1951	35 E.S.	20	57.7	8	12
	40 Bulls	19	48.4	19	0
Totals	345	233	67.5	154	79

From the above table it can be conservatively assumed that two-thirds of the hunters will be successful under an either sex season. Hunters with bull permits will be slightly less successful. This taken into consideration in recommending a season for 1952 indicates the following: To effect a harvest of the known surplus of 66 bulls, at least 100 permits would have to be issued. An additional 125 permits on elk of either sex would reduce the herd by only 80-85 animals, thus by issuing the 225 permits we should reduce the elk herd by approximately 160 head. Thus 455 elk, plus estimated 1952 increase equals 560 elk, minus 160 elk (harvest) equals a winter population of approximately 400 head. With a desired level of 300 elk the safety margin is more than adequate.

Little Belts Unit (Castle Mountains)

This range is quite small and is completely surrounded by private lands. Whenever this elk herd approaches 250 head trouble starts in the form of damage complaints.

Bull seasons and short either sex seasons seem to be the proper way of keeping this herd in check. Despite the small area and the fact that it is readily accessible to many hunters, the elk seem to be able to withstand the pressure. Many roads in and out of this area make it impractical to check all hunters.

It is recommended the 1952 season be on bulls only, due to the possibility that some of the elk counted last winter had migrated from the Dunkel Ranch in the Little Belt Mountains.

Fergus Unit (Judith Mountains)

Only five of the fifteen hunters holding permits in this area during 1951-52 were successful. The chief factor contributing to this low ratio was deep snow, making it impossible to get into the area.

Another count should be made during the late summer when elk are making nightly forages on the alfalfa and oat fields. While this may not include all of the elk it gives a base from which to begin, in issuing permits.

Submitted by:

Name Don L. Brown

Title Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1952

STATE Montana
PROJECT NO. 1-R-11 (Western)
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR
INVESTIGATIONS PROJECTS
As Required By
FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. **Title of Project:** Wildlife Survey and Management (Western)
2. **Leader:** Lloyd E. McDowell, Biologist
3. **Report of Progress:**

Work Plan I: Big Game Population Studies

Job I-A: Big Game Survey in South Fork of Flathead

Techniques Used:

Two planes were flown to the Big Prairie Landing Field in the South Fork of the Flathead. A ski-equipped J3 - 85 h.p. Piper Cub and a ski-equipped 105 Super Cub were used. The landing field was covered with approximately 36 inches of loose snow. Both planes were unable to take off until a runway was packed with the aid of snowshoes. The metal skis did not function very well in the loose snow. It is suggested that over-size wooden skis be used in the future.

A packed landing strip should be made on each side of the field, with a large half circle connecting the two strips at both ends. By using this procedure a plane is able to continue around the field until it has gained enough speed for a safe take-off. If possible, the plane should make a few trips around the field to pack a runway before it stops. If the plane is to be stopped for any period of time, the skis should not be left in contact with the snow. Poles or evergreen boughs should be put under the skis. Light weight wing covers should be carried at all times so the plane can be covered at night to prevent frost from forming on the wings. A single burner gasoline stove with a few sections of stove pipe was used to heat the plane motor before starting. Removing the oil in the evening after use and warming it in the morning before putting it in the plane also proved beneficial to help start the plane in temperatures below zero.

Each plane was equipped with an emergency kit which consisted of: a first aid kit; 2-C4 rations, axe, candles, hunting knife, and either a handgun or rifle.

The J3 Piper Cub proved to be inadequate in power and range for operating in high, mountainous terrain. Both pilot and observer felt that nothing smaller than a 105 Super Cub with a six hour gas range should be used.

A 125 h.p. Super Cub was used to complete the project. This plane could be flown with half flaps at 50-60 miles per hour air speed and still maintain a safety margin. (The slower the air speed the more accurate the aerial census.) In addition, it had a maximum air speed of approximately 110 miles per hour which proved a great advantage going to and from the area being worked.

Early morning and late evening proved to be the best time of day for seeing the animals. A bright day after a fresh snow was also a great advantage. At that time the elk could be tracked if they had moved to cover. Flying low over the area 3 or 4 times usually would make the animals get up and move so they could be seen and counted. The sound of firing a pistol at low altitude was the most effective way of moving animals from heavy cover so they could be counted.

If the group spotted was large and bunched together, a photograph was taken to be used later as a check count.

Each area was counted at least twice on different days and sometimes three and four times to insure an accurate census. Usually the plane was flown in long figure eights starting from the head of a drainage and working from side to side to its mouth. In flat terrain, strips were flown close enough together to get a complete coverage.

Weather proved to be the main limiting factor for continued aerial census. There were only approximately ten good flying days each winter month. To cover an area as large as western Montana during the good flying days available throughout the winter, more than one plane must be used. Due to this time limit, a number of areas could not be counted by one plane.

One-half hour's flying time in a Helicopter was donated to the Department by the Johnson Flying Service to make a comparison between it and a fixed wing plane. The Helicopter was better for the following reasons:

1) It was able to fly slower and therefore give the observer a better chance to make a complete count.
2) It provided better vision.
3) The noise and rush of air from the propeller tended to frighten and make the elk move from cover better than a conventional plane.
4) The elk could be moved in any direction desired by flying in front of them.
5) It could land on a much smaller field.

The Helicopter had the following disadvantages:

1) Too costly to operate in comparison with a fixed-wing ship.
2) Only 2½ hour's flying range.
3) Not enough area covered flying at a slow enough speed to be more effective than fixed-wing plane.
4) Limited by the same bad weather flying conditions as a regular plane is.
5) Started only by battery, which is difficult at zero and below temperatures.

Spring Dead Animal Check.

On April 22-25 a spring dead-animal count was made in the South Fork. The snow had melted from Big Prairie Landing Field and a wheel-equipped 125 Super Cub plane was used. However, skis were used to land one man near the Danaher Guard Station. Following is a summary of animals observed:

Danaher Meadows:	6 bulls, 94 cows 10 calves 3 dead calves 3 dead cows 1 dead bull

Basin Creek: 1 bull, 21 cows
no calves
2 dead cows
3 unidentified dead elk

Big Prairie: 35 cow elk, no calves
3 dead calves

Summary:			
Live:	Bulls, 7	Cows, 150	Calves, 10
Dead:	Bulls, 1	Cows, 5	Calves, 6
Unidentified:	3		

It appeared that there was a heavy loss of calf elk. Winter food supplies in the upper South Fork are diminishing more each year and the result is that the calf crop is hit the hardest.

Unless the overall winter population can be cut much lower than at present, it looks like the herd will reach a very low figure before the vegetation will be able to maintain itself and thus stabilize the herd at possibly one-half its present number. For this reason, it is recommended that the elk season in the upper South Fork be set for both sexes from September 15 to November 15 each year until the vegetation shows a comeback. Not until that time will the winter losses decrease, even during a mild winter like the last one.

Summary of South Fork Aerial Elk Census, February 1952.

Big Prairie Unit		Spotted Bear Creek	
Danaher	207	Sullivan Creek	39
Basin Creek	126	George Creek	156
Young's Creek	192	Harrison Creek	38
Gordon Creek	7	Lost Jack	15
Big Salmon	41	Black Bear Creek	84
Phil Creek	56	Hodog Creek	15
White River	52	Helen Creek	10
Big Prairie	89	Horse Ridge	97
Damnation Creek	15	North Twin Creek	60
Lewis Creek	47	South Twin Creek	72
Woodfir and Pine Creeks	31	Spotted Bear Creek	52
Little Salmon	29	Dry Park Area	254
Burnt Fork	7	Dry Park to Hungry Horse Dam	126
Entire river bottom from Young's Creek to Helen Cr.	142		1018
	1041		

Totals:		
	Big Prairie	1041
	Spotted Bear	1018
	Schafer	392
		2451

Job I-B: Big Game Survey in Blackfoot-Clearwater

The same aerial procedure used in the South Fork of the Flathead was followed in this area.

Summary of Census

Elk

AREA:	
Ovando Mountain and vicinity	100
Dry Cottonwood	25
Boyd Mountain and vicinity	20
Double Arrow Ranch	10
North of Cottonwood Lakes	5
Trail Creek	5
Placid Lake Hill	10
Owl Creek	10
Prairie Creek	10
Lost Horse Creek	5
Blanchard Creek	15
Belmont Creek	40
Chamberlain Creek	40
Mineral and Markham Mountain	110
Gold Creek and Twin Creeks	30
Elk Creek	15
Greenough area	25
Total	475

DEER	White-tailed	Mule
Lincoln Canyon	300	50
Markham, Mineral & Dalton Mts.	500	500
Monture Hill & Creek, McCabe Creek	500	300
River Breaks, Helmville to Clearwater	500	400
Boyd Mountain, Sperry Mt.	250	150
Salmon Lake Hills & vicinity	200	200
Placid Lake Hills & Owl Creek	300	50
Totals	2550	1650

Total deer in area covered (estimated plus seen) 4200

RECOMMENDATIONS:

1. **Elk:** Regular season in entire area. Close on two days' notice if kill goes over 150 at Bonner Checking Station.

2. **Deer:** 30 day season on both sexes. Both white-tailed and mule deer are at the critical population stage and if hunters do not reduce the herd, winter losses will.

Job I-C: Big Game Survey in Swan

During the months of November and December 1951, 2½ to 4 feet of snow accumulated on the white-tailed deer range in the Swan Valley. Due to public sentiment, the Department decided to start a feeding program. The first feed was put out on January 17 and the last on March 4. A total of 9 trips was made to the area. A round trip from Missoula consisted of approximately 240 miles of driving and usually took two days. A total of 3½ tons of hay, 1600 lbs. of protein pellets and about 200 lbs. of leavings from popcorn machines was distributed.

Feed grounds were plowed away from the main road to reduce casualties from cars. They were located at Holland Lake Guard Station, Condon Ranger Station, Lion Creek Bridge, Boundary Trail, Simmonds Meadows and at Goat Creek Guard Station.

At Goat Creek only hay was fed. This was done to make a comparison in the condition of animals at other feed grounds where hay, pellets and popcorn were fed.

During the last week in January there was a general thaw and the snow settled to approximately 20 inches and then crusted over. This enabled the deer to move about on top of the snow and hunt for "Alectoria" moss, which drops from the trees. It seems to be their main winter food supply along with a limited amount of browse and conifer needles. All browse near the feed grounds was utilized completely. Hard packed trails led as far as five miles away.

All feed put out was consumed within a day or two. The deer then remained nearby until more was distributed the next week. Mature deer fought off the younger ones and kept them from obtaining many protein pellets. For this reason the pellets were scattered at random over a large area. Pellets were hunted and eaten first, and the hay cleaned up later.

On February 7, 1952, 64 deer were seen on the feed ground at Goat Creek. Eleven others were observed nearby. It was estimated that approximately 1000 deer used the feed grounds out of a possible 5000-6000 in the valley. Very few losses were noted during the feeding operations.

A total of 67 miles of strips were run to check the population by the strip-count method. This type of census was first started in 1943 in the Swan by William Bergeson. Due to the concentrations of deer near the feed grounds, numbers observed were very erratic and no comparison in distribution could be made with previous years and it was felt the census strip method could not be used under such conditions.

An aerial census of elk was attempted in January, but due to the early deep snow, most of the elk were driven to the heavy cover of the bottoms and could not be counted accurately. In the future, it is suggested that the aerial census on elk be conducted immediately after the first heavy snows. Usually the month of December would be best.

CONCLUSIONS:

1. When started before the animals become weak, apparently supplementary feeding does not harm the deer.

2. Since no dead deer were found near the feed grounds, no comparison other than visual could be made between the station where only hay was fed, and the others where protein pellets and popcorn were also fed. However, it was believed by the men doing the feeding, that deer at Goat Creek were in poorer condition than any place else.

3. Feeding upset the normal distribution to such an extent that all available browse near the stations was heavily over-utilized. For this reason, these areas will be of little value as wintering grounds in future years unless feeding is continued. This reason makes feeding impractical unless the entire herd is threatened with extinction.

4. At least the annual increase should be harvested by hunters from this herd each fall. This could be accomplished by setting a kill figure and leaving the season open until the desired number has been checked through the checking station at each end of the Valley. This would mean a harvest of at least 1000 deer from the Swan each fall.

Job I-D: Big Game Survey in Thompson Falls - Cherry Creek

One inspection trip was made to this area on March 19, 1952. A total of 139 white-tailed deer were seen from the road between the mouth of Thompson River and Bend Ranger Station. All deer observed were in good condition. No feeding was done this past winter.

Apparently the either sex seasons the last two years have brought the herd into balance with its winter range. A ten day either sex hunt is recommended for this fall.

A ten day either sex hunt on elk is also recommended, including Dry Creek-Cherry Creek area.

Job I-E: Big Game Survey in Fish Creek

No additional work since previously reported.

Job I-F: Big Game Survey in Petty Mountain

No additional work since previously reported.

Job I-G: Big Game Survey in Garnet Range

No additional work since previously reported.

Job I-H: Big Game Survey in Bitterroot

No additional work since previously reported.

Work Plan II: Big Game Reproduction, Age Classification and Hunter Utilization

Job II-A: Age Classification and Herd Rate of Increase

This work was reported in the January Quarterly.

Job II-B: Hunter Utilization

This work was completed in December and reported in the January Quarterly.

Work Plan III: Study of the Migratory Habits of Big Game in Key Areas

Job III-A: Tagging and Release of Mature Elk on the Blackfoot-Clearwater Game Range

No additional work since previously reported.

Job III-B: Tagging and Release of Mature Elk in the Bitterroot

No additional work since previously reported.

Work Plan IV: Range Inspection and Browse Measurements

Job IV-A: Forage Utilization in Key Areas

This work was discontinued due to error in the method. It was felt that the annual growth could not be measured after the animals had eaten portions of it. Many times the spring measurement amounted to more than fall measurement. No doubt the second year's growth was being mistaken for the annual growth.

Job IV-B: Range Condition Survey

This work was done in conjunction with census work. On all areas visited browse and grass use was closely observed. This information, along with the condition of the animals wintering on the range was used to base harvest recommendations upon. In a number of areas, the use of grass during January and February by white-tailed deer was quite noticeable.

One example is Markham and Mineral Mountains in the Blackfoot Valley. Approximately 500 white-tailed deer wintered on wind blown open hillsides covered mainly with grass. Very little browse is available. These deer competed with both mule deer and elk and came through the winter in fair condition with no more than average loss.

Work Plan V: Rocky Mountain Sheep Investigation

Job V-A: B C

Personnel: Lloyd McDowell, Leader
Herman A. Ogren, Junior Biologist

Introduction: The bighorn sheep population which has been introduced on Wildhorse Island in Flathead Lake is probably one of the most productive in the State of Montana. Because the sex and age of the animals introduced on the Island is known, it was possible to project the maximum number of animals (and lamb production) which could be present at this date. Census shows that apparently this interesting herd is breeding and producing at maximum rate. Because these animals are confined to an island of only 4 square miles, it is felt that control and continuous observation of them would not be difficult for one or a few observers. With the lambs this spring there are about 60 bighorn sheep living on the island. Two were planted in 1939 and six in 1947 (3 males and 5 females).

Purpose: This study is primarily concerned with the biology and survival of the lamb. Previous workers feel that bighorn sheep herds are not increasing because of low survival in the younger age group.

Procedure and Techniques: It is hoped to be able to mark a number of lambs so they could be recognized as individuals in the field and follow them through at least the first year of life with intensive study. It would be desirable to mark as many adult (especially females) animals as possible so they could be recognized as individuals in the field.

A tentative work plan is:

1) 1 day per week spent on organizing notes to permanent notebook
2) 1 day per week identifying plants and constructing vegetational map
3) 1 day per week on food and water utilization by sheep
4) 1 day per week on attempts to capture and mark animals, using some type of trap, tear gas projectile, and spotlight techniques.
5) 2 days per week on detailed observation of sheep, especially herd composition and movement in respect to vegetation types.
6) 1/2 day per week observing captive lamb
7) 1/2 day per month may be used to x-ray teeth development of captive lamb.

It is felt the "jacking" of the lambs after dark, using 12 volt spotlights is a technique which has possibilities for capture and marking. The exact bed site is marked by the observer, who must know the country thoroughly, and then with team mate, stalk to the herd after dark to "spot" animals which are dazzled by light.

It is also possible to follow ewes showing late pregnancy symptoms until they drop their lambs, which are helpless right after birth.

During late June the ewe-lamb herd has begun to come in large numbers to a natural lick. It is hoped some animals can be trapped with a corral trap at this site or driven into the trap, which is now set up in a sheep runway. Plastic ear tags, dye (for sides of animals), and ear-cutting have been used in marking.

Results to date: Fourteen lambs (minimum count) have been born this spring. Three were captured and marked when they were too young to escape capturer. Three more were captured with "spotlighting" technique. One of these has been fostered by the worker for one month. Body weights and measurements, tooth development and wear and qualitative food comsumption data will be obtained by observing it.

Work Plan VI: Rocky Mountain Goat Investigation

Job VI-A: Study of Movements and Migration of Mountain Goats

Job VI-B: Age Determination by Tooth Wear and Replacement

Job VI-C: Sex Ratio and Herd Reproductive Studies

Job VI-D: Study of Mountain Goat Winter Range Distribution

A complete report of all Mountain Goat work is being prepared and analyzed. It will be submitted at a later date, under separate cover.

Work Plan VII: Aerial Salt Distribution

Job VII-A: Aerial Salt Distribution

This work is being reported under Project 26M.

Submitted by:

Name Lloyd E. McDowell

Title Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1952

STATE Montana

PROJECT 1-R (Statistics)

DATE July 15, 1952

STATE-WIDE

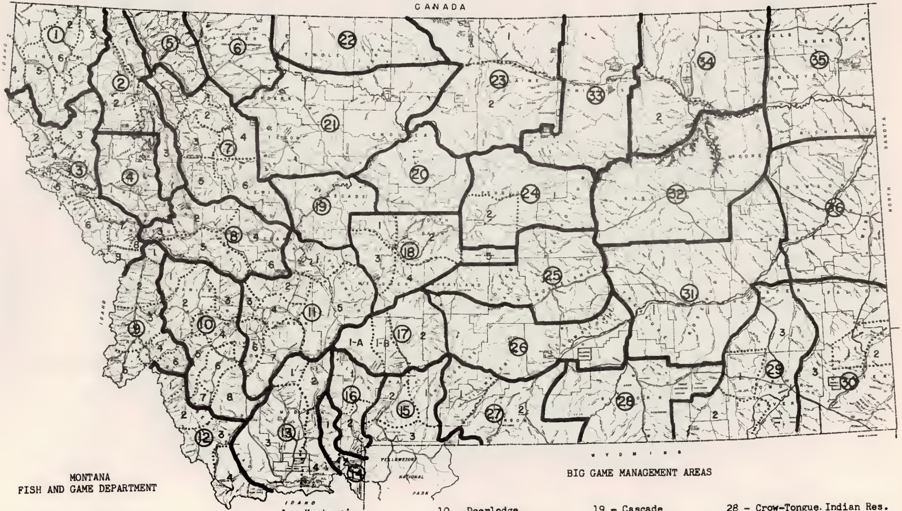
CUMULATIVE RECORD OF BIG GAME DATA

The accompanying map and tabulation show the location of the thirty-six big game units and their subunits, along with the estimated population, legal kill and other losses for each species of big game.

These figures are determined annually following checks on winter survival. Game wardens, field personnel and public land administrators get together and arrive at a mutually agreeable figure for each subunit. All available data are used, such as census figures, checking station reports and other field observations.

This is a reasonable approximation of the total number and it is felt that the attached tables indicate a good estimate of the game population in the state. Kill figures are probably the least reliable. For more accurate data on this, reference is made to the report on card questionnaires for Project 41-R which appears in the January-March 1952 Quarterly Project Report.

Submitted by:	Approved by:
Name Faye M. Couey	Montana State Department of Fish & Game
Title Big Game and Lands Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952



MONTANA
FISH AND GAME DEPARTMENT

BIG GAME MANAGEMENT AREAS

LEGEND
—— Unit Boundary
.... Sub-Unit Boundary

1 - Kootenai
2 - Kalispell
3 - Clark Fork
4 - Polson
5 - Glacier Park
6 - Blackfoot Indian Res.
7 - Flathead Sun River
8 - Blackfoot
9 - Bitterroot
10 - Deerlodge
11 - Big Belt - Boulder
12 - Big Hole - Monida
13 - Madison - Ruby
14 - Ennis - Hebgen
15 - Absaroka
16 - Gallatin
17 - Bridger - Crazy Mts.
18 - Little Belts
19 - Cascade
20 - Choteau
21 - Teton
22 - Sweetgrass Hills
23 - Blaine
24 - Fergus
25 - Musselshell
26 - Yellowstone
27 - Beartooth
28 - Crow-Tongue Indian Res.
29 - Powder River
30 - Carter
31 - Custer
32 - Missouri Breaks
33 - Phillips
34 - Glasgow
35 - Poplar
36 - Glendive

ANNUAL BIG GAME REPORT, 19__

1.____________________________________Management Unit

2.____________________________________Number of Subunit

3. Species	Elk	W.T. Deer	Mule Deer	Moose	Mtn. Sheep	Mtn. Goat	Antelope	Grizzly Bear	Black Bear
4. Est. No. Animals on unit--winter range only.									
5. Losses: Legal kill									
Predators									
Other									
Total									

6. Remarks:____________________________________

7. Reporting Officer:

Signature____________________________
(Title)

Signature____________________________
(Title)

CUMULATIVE RECORD OF BIG GAME DATA

ANTELOPE

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Other	Total
Absaroka	175				
Beartooth	430	6			6
Big Belt - Boulder	785	147	13	35	195
Big Hole - Monida	275	137	30	20	187
Bitterroot	5				
Blackfoot					
Blaine	1,200	100	25	22	147
Bridger - Crazy Mtns.	705	60	35	55	150
Carter	2,880	515	82	13	610
Cascade	1,100		4	20	24
Choteau	1,500	50		10	60
Clark Fork					
Custer	4,500	950	200	800	1,950
Deer Lodge	490	25	30	17	72
Ennis - Hebgen	90		10	4	14
Fergus	2,000	60	200		260
Flathead - Sun River					
Gallatin					
Glasgow	1,650	50	35	150	235
Glendive	1,400			25	25
Kalispell					
Kootenai					
Little Belts	814	100	5	6	111
Madison - Ruby	2,125	125	50	125	300
Missouri Breaks	6,000	1,500	50	50	1,600
Musselshell	7,500	3,500	150	500	4,150
Phillips	1,000	45	25	25	95
Polson	75	10			10
Poplar	246		15		15
Powder River	3,700	310	80	158	548
Sweetgrass Hills	800	97	10	30	137
Teton	750		10	20	30
Yellowstone	7,500	2,900	650	100	3,650
Blackfoot Ind. Res.	75	10			10
Crow-Cheyenne Ind. Res.	550				
Moiese Bison Range	15				
Yellowstone Nat'l Park	275				
Glacier Park					
Total	50,610	10,697	1,709	2,185	14,591

CUMULATIVE RECORD OF BIG GAME DATA

MULE DEER

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Others	Total
Absaroka	4,700	775	50	110	935
Beartooth	7,800	2,000	20	110	2,130
Big Belt - Boulder	13,195	1,335	110	230	1,675
Big Hole - Monida	3,300	352	35	71	458
Bitterroot	2,550	647	150	65	862
Blackfoot	9,500	1,515	255	280	2,050
Blaine	3,900	580	15	17	612
Bridger - Crazy Mtns.	10,135	3,640	130	340	4,110
Carter	2,000	295	20	11	326
Cascade	2,100	500	18	40	558
Choteau	3,000	300	20	130	450
Clark Fork	9,450	975	75	150	1,200
Custer	4,000	1,468		700	2,168
Deer Lodge	13,510	1,702	210	449	2,361
Ennis - Hebgen	1,575	225	60	120	405
Fergus	6,100	1,500	250	650	2,400
Flathead - Sun River	5,150	1,142	155	400	1,697
Gallatin	1,605	365	75	60	500
Glasgow	2,500	350	40	65	455
Glendive	1,000	75		75	150
Kalispell	775	100	25	100	225
Kootenai	7,125	700	200	1,500	2,400
Little Belts	18,509	2,323	130	415	2,868
Madison - Ruby	9,050	1,040	85	105	1,230
Missouri Breaks	3,000	250	20	50	320
Musselshell	3,000	800	50	350	1,200
Phillips	3,700	800	25	30	855
Polson	700	100	20	200	320
Poplar	610	75	5		80
Powder River	6,300	1,035	127	260	1,422
Sweetgrass Hills	400	5		25	30
Teton	3,700	500	10	500	1,010
Yellowstone	3,000	1,000	50	150	1,200
Blackfoot Ind. Res.	250	100	6		106
Crow-Cheyenne Ind. Res.	3,200	900			900
Moiese Bison Range	400			50	50
Glacier Park	635			200	200
Yellowstone Nat'l Park	600			200	200
Total	172,024	29,469	2,441	8,208	40,118

CUMULATIVE RECORD OF BIG GAME DATA

WHITE-TAILED DEER

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Other	Total
Absaroka					
Beartooth	370		3	16	19
Big Belt - Boulder	300	21	12	38	71
Big Hole - Monida					
Bitterroot	340	41	23	32	96
Blackfoot	5,290	830	192	338	1,360
Blaine	430	58	7	12	77
Bridger - Crazy Mtns.	55	5	7	6	18
Carter	235	44	6	7	57
Cascade	140	10	2	5	17
Choteau	10				
Clark Fork	7,350	1,045	235	1,375	2,655
Custer	150	10		14	24
Deer Lodge	570	85	37	32	154
Ennis - Hebgen					
Fergus	1,600	210	70	290	570
Flathead - Sun River	950	216	19	150	385
Gallatin					
Glasgow	1,215	155	28	39	222
Glendive	1,400	125		125	250
Kalispell	3,500	575	95	1,250	1,920
Kootenai	10,300	1,015	240	2,875	4,130
Little Belts	614	32	15	25	72
Madison - Ruby	30				
Missouri Breaks	900	75	10	15	100
Musselshell	100	5	5	15	25
Phillips	500	50	10	15	75
Polson	500	50		150	200
Poplar	3,050	450	41	19	510
Powder River	380	20	10		30
Sweetgrass Hills					
Teton	75	5		2	7
Yellowstone					
Blackfoot Ind. Res.	275	50	6		56
Crow-Cheyenne Ind. Res.	230			75	75
Moiese Bison Range	130			30	30
Glacier Park	450			150	150
Yellowstone Park					
Total	41,439	5,182	1,073	7,100	13,355

CUMULATIVE RECORD OF BIG GAME DATA

ELK

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Others	Total
Absaroka	1,700	3,220	20	65	3,305
Beartooth	375	54		16	70
Big Belt - Boulder	1,945	245	5	39	289
Big Hole - Monida	706	33		2	35
Bitterroot	1,270	521	18	35	574
Blackfoot	1,855	531	25	34	590
Blaine	90			15	15
Bridger - Crazy Mtns.	129		7	6	13
Carter					
Cascade	125	40			40
Choteau	450	45		5	50
Clark Fork	3,015	469	10	53	532
Custer	20				
Deer Lodge	2,686	225	2	33	260
Ennis - Hebgen	575	126	15	24	165
Fergus	87	5		5	10
Flathead - Sun River	6,470	1,920		380	2,300
Gallatin	1,340	966	20	300	1,286
Glasgow	96			4	4
Glendive					
Kalispell	565	140			140
Kootenai	790	150			150
Little Belts	1,385	393		24	417
Madison - Ruby	1,984	40	13	20	73
Missouri Breaks					
Musselshell					
Phillips	117				
Polson	35				
Poplar					
Powder River	20				
Sweetgrass Hills					
Teton	103	29		4	33
Yellowstone	45				
Blackfoot Ind. Res.	400	60			60
Crow-Cheyenne Ind. Res.	4,003	1,000			1,000
Moiese Bison Range	75				
Glacier Nat'l Park	2,185				
Yellowstone Nat'l Park	11,300	4,300			4,300
Total	45,941	14,512	135	1,064	15,711

CUMULATIVE RECORD OF BIG GAME DATA

MOOSE

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Others	Total
Absaroka	345	7		14	21
Beartooth	95			3	3
Big Belt - Boulder	167			7	7
Big Hole - Monida	349	21			21
Bitterroot	305	13		8	21
Blackfoot	2				
Blaine					
Bridger - Crazy Mtns.	42				
Carter					
Cascade					
Choteau					
Clark Fork	133			1	1
Deer Lodge	846	23		15	38
Ennis - Hebgen	125	5	5	10	20
Fergus					
Flathead - Sun River	129				
Gallatin	148	13	3	23	39
Glasgow					
Glendive					
Kalispell	90			20	20
Kootenai	270			30	30
Little Belts	12			2	2
Madison - Ruby	287	3	2	7	12
Missouri Breaks					
Musselshell					
Phillips					
Polson					
Poplar					
Powder River					
Sweetgrass					
Teton					
Yellowstone					
Blackfoot Ind. Res.	20	5			5
Crow-Cheyenne Ind. Res.					
Moiese Bison Range					
Glacier Nat'l Park	95			5	5
Yellowstone Nat'l Park	600			30	30
Total	4,060	90	10	175	275

CUMULATIVE RECORD OF BIG GAME DATA

MOUNTAIN SHEEP

ESTIMATED POPULATION LOSSES -- 1951-52

Management Area	Est. Pop.	Legal Kill	Predators	Other	Total
Absaroka	55		12	11	23
Beartooth	185		2	5	7
Big Belt - Boulder					
Big Hole - Monida					
Bitterroot	20		5		5
Blackfoot	45				
Blaine					
Bridger - Crazy Mtns.					
Carter					
Cascade					
Choteau					
Clark Fork					
Custer					
Deer Lodge	30		5	5	10
Ennis - Hebgen	46		2	2	4
Fergus					
Flathead - Sun River	270			18	18
Gallatin	86		7	5	12
Glasgow					
Glendive					
Kalispell					
Kootenai	351			75	75
Little Belts					
Madison - Ruby	13				
Missouri Breaks	60			2	2
Musselshell					
Phillips					
Polson	40			10	10
Poplar					
Powder River					
Sweetgrass Hills					
Teton					
Yellowstone					
Blackfoot Ind. Res.					
Crow-Cheyenne Ind. Res.					
Moiese Bison Range	25			5	5
Glacier Park	260				
Yellowstone Park	140				
Total	1,626	0	33	138	171

CUMULATIVE RECORD OF BIG GAME DATA

MOUNTAIN GOATS

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Other	Total
Absaroka					
Beartooth	7				
Big Belt - Boulder	37				
Big Hole - Monida	56				
Bitterroot	510		50	33	83
Blackfoot	130				
Blaine					
Bridger - Crazy Mtns.	150		20	5	25
Carter					
Cascade					
Choteau	15				
Clark Fork	105				
Custer					
Deer Lodge	580				
Ennis - Hebgen	18				
Fergus					
Flathead - Sun River	1,145	120	30	100	250
Gallatin	7				
Glasgow					
Glendive					
Kalispell	135				
Kootenai	220				
Little Belts					
Madison - Ruby					
Missouri Breaks					
Musselshell					
Phillips					
Polson	65				
Poplar					
Powder River					
Sweetgrass Hills					
Teton					
Yellowstone					
Blackfoot Ind. Res.	12				
Crow-Cheyenne Ind. Res.					
Moiese Bison Range					
Glacier Nat'l Park	850				
Yellowstone Nat'l Park					
Total	4,042	120	100	138	358

CUMULATIVE RECORD OF BIG GAME DATA

BLACK BEAR

ESTIMATED POPULATION   LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Others	Total
Absaroka	220	45		15	60
Beartooth	260	15		5	20
Big Belt - Boulder	300	16		1	17
Big Hole - Monida	70	1			1
Bitterroot	235	34		22	56
Blackfoot	595	66		5	71
Blaine					
Bridger - Crazy Mtns.	163	19		2	21
Carter					
Cascade	16	5			5
Choteau					
Clark Fork	900	75		22	97
Custer					
Deer Lodge	335	33		15	48
Ennis - Hebgen	225	15		30	45
Fergus	5				
Flathead - Sun River	515	25		5	30
Gallatin	147	18		10	28
Glasgow					
Glendive					
Kalispell	620	75			75
Kootenai	1,405	100			100
Little Belts	141	13		9	22
Madison - Ruby	350	27		3	30
Missouri Breaks					
Musselshell					
Phillips					
Polson	45				
Poplar					
Powder River	1				
Sweetgrass Hills					
Teton	40	2			2
Yellowstone					
Blackfoot Ind. Res.	100	15			15
Crow-Cheyenne Ind. Res.	125				
Moiese Bison Range					
Glacier Nat'l Park	375				
Yellowstone Nat'l Park	360				
Total	7,548	599	0	144	743

CUMULATIVE RECORD OF BIG GAME DATA

GRIZZLY

ESTIMATED POPULATION LOSSES -- 1951-52

Management Unit	Est. Pop.	Legal Kill	Predators	Other	Total
Absaroka	30	5			5
Beartooth	12				
Big Belt - Boulder	2				
Big Hole - Monida	1				
Bitterroot	3				
Blackfoot	45	2			2
Blaine					
Bridger - Crazy Mtns.					
Carter					
Cascade					
Choteau					
Clark Fork	25				
Custer					
Deer Lodge	3				
Ennis - Hebgen	15			3	3
Fergus					
Flathead - Sun River	189	10			10
Gallatin	14				
Glasgow					
Glendive					
Kalispell	65	3			3
Kootenai	96				
Little Belts					
Madison - Ruby	2				
Missouri Breaks					
Musselshell					
Phillips					
Polson	10				
Poplar					
Powder River					
Sweetgrass Hills					
Teton					
Yellowstone					
Blackfoot Ind Res.	3				
Crow-Cheyenne Ind. Res.					
Moiese Bison Range					
Glacier Nat'l Park	120				
Yellowstone Nat'l Park	180				
Total	815	20	0	3	23

STATE Montana
PROJECT NO. 35-R-3
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Gallatin Management Unit

2. Leader: J. E. Gaab, Unit Biologist

Norman Wortman, Fieldman
Austin McDonald, Part-time Laborer
Bill Keezer, Part-time Asst. Fieldman
Phil South, Part-time Jr. Biologist
Jack Saunders, Part-time Student Asst.
Jack Lentfer, Part-time Student Asst.
Frank Cunningham, Part-time Asst. Fieldman

3. Report of Progress:

Work Plan I: Big Game Population Studies

Job 1-A: Progressing.

1. Two general inspections of Stillwater Game Preserve.
   a. This game preserve is recommended to be abandoned to decrease competition between mountain sheep and mule deer by allowing either sex deer hunting in accordance with the adjacent areas.
2. General inspection of winter elk range Rock Creek. (Red Lodge, Montana)
   a. About 300 elk estimate within the area.
   b. Fifty elk from Yellowstone Park released in the area by Red Lodge Sportsmen.
   c. Due to unaccessibility of hunting area and the herd close to range carrying capacity, it is recommended to hunt branch-antlered bull elk from Oct. 15th through Nov. 12th and either sex from Nov. 13th through Nov. 15th. Open Area: that portion of Carbon County lying west of the

Clarks-Fork of the Yellowstone River and south of the Belfry-Red Lodge-Luther-Roscoe-Absarokee roads.

3. General inspection of upper west Boulder River.

    a. Primary reason for this inspection was an attempt to collect a goat reported in the area. Two bear hunters observed the goat and found it in such a weakened condition they were able to catch it and read the ear tag; No. 9 Sun River herd. The animal was transplanted in the Stillwater drainage near the Bear Tooth Ranch in the spring of 1942 as mature. The animal is at least twelve years old.
    b. Mule deer were observed in good condition drifting onto summer range. Two winter losses were found.
    c. Considerable wintering moose sign was observed.

Job 1-B: Inactive during report period.

Job 1-C: Progressing.

1. General inspection of elk range upper Yellowstone.

    a. Range in excellent condition with the exception of the migration corridor at the mouth of the Yellowstone River Canyon along the Park boundary.
    b. Winter losses light. Cause of death of most carcasses found was attributed to gunshot wounds from January, 1952 hunting season.
    c. Winter use extended to Stan's basin north of Dome Mountain.

Job 1-D: Progressing.

1. General inspection of elk range West Gallatin.

    a. Range research to be reported separately.
    b. Winter loss heavy. Included in winter study report.

2. Upper Gallatin elk winter study completed. Job Completion report attached.

Job 1-E: Progressing.

1. Harrison Antelope Census - Job Completion Report attached.

2. Inspection of elk winter range east side of Madison River.

    a. 432 elk wintering throughout the area, 288 considered migrants from the Gallatin (see P.R. Quarterly January - May, 1952, Page 42), the area where elk concentrate for about 2½ months was covered thoroughly. The range did not indicate abuse by elk, although a large share of last year's forage growth was consumed. The elk moved off of the steep unstable slopes before they thawed.
    b. Seven elk carcasses were found, six died from gunshot wounds and one was caught in a fence.
    c. The natural elk winter range where migrants from the Gallatin concentrate is under consideration for state acquisition. An undesirable situation exists with private landholders in years when wintering conditions in the West Gallatin River drainage become acute and elk are forced to seek range on the Madison River drainage. This migration has been discouraged in the past by herding the elk back. However, when that is done it is possible that heavier losses will occur in the Gallatin when extreme wintering conditions are prevalent. The acquisition of elk range on the Madison would provide adequate range during periods of extreme conditions in the West Gallatin.

Job 1-F: Progressing.

1. The necessity for an adequate mule deer harvest is evident and attempts toward that end are being made.

Job 1-G: Inactive during this report period.

Job 1-H: Progressing.

1. Investigation of moose habitat within and adjacent to Red Rock Refuge.

    a. Willow browse is used down to the available snow line, aspen is used to the extent of extreme high-lining.
    b. Without adequate natural forage available the moose resort to haystack damage.

2. Antelope investigation in Big Sheep and Medicine Lodge Creeks.

   a. Past observations indicate that antelope are only prevalent in this area during the summer. It was brought out in a meeting with Idaho Fish & Game Department personnel that very likely there is an inter-state relationship.
   b. Idaho has previously tagged antelope on winter range and it appears desirable that Montana tag on the summer range. Hunting seasons to comply with each other would undoubtedly give some interesting results.

Job I-I: Inactive during report period.

Job I-J: Progressing.

1. Preliminary investigations and arrangements were made to start Rocky Mountain Goat surveys in the Crazy Mountains. All big game species will be observed and data recorded as to summer distribution.

2. Shields River antelope census.

   a. Aerial count June 25th, excellent conditions, low overcast, although not all of the females with young had joined the groups yet.
   b. Findings:
      Sixty-six mature, sixteen young west side of Highway No. 89.
      Sixty-nine mature, eighteen young east side of Highway No. 89.
      Fifteen estimate in Elk Creek.
      Total - One hundred and eighty four.
   c. These antelope have become quite troublesome in wheat fields and public opinion prefers a reduction.
   d. An attempt was made earlier to drive these antelope out of problem areas by airplane which didn't prove successful. Those that were driven out some distance returned; in other areas the fences being sheep tight didn't permit driving antelope through them.

Job I-K: Progressing.

1. Limestone Big Game Closure.

   a. This closure has previously been recommended to be open to hunting.

b. Investigation was made and winter range use was found to be excessive. Considerable deer are having fawns in this very important wintering area and indicate that they do not migrate into higher summer range.

Work Plan II: Big Game Reproduction, Age Classification and Hunter Utilization.

Job II-A: Progressing.

1. Reference is made to Dr. Quimby's Progress Report on Age Determinations of Elk by tooth displacement and wear in the 1952 Transactions of Western Association of Game & Fish Commissioners.

2. Reference is made to Dr. Cheatum's "Productivity of Northern Yellowstone Elk As Indicated by Ovary Analysis" in the 1952 Transactions of Western Association of Game & Fish Commissioners.

Job II-B: Inactive during this report period.

Work Plan III: Study of the Migratory Habits of Big Game in Key Areas.

Job III-A: Progressing.

1. West Gallatin calf elk tagging - Job Completion Report attached.

2. Yellowstone calf elk tagging - Job Completion Report attached.

Job III-B: Inactive.

Job III-C: Progressing.

1. Gallatin - Madison elk migration.

   a. On May 17th, Cache Creek pass was checked for elk returning to the Gallatin. It was found that three groups of elk had returned to the Gallatin before calving, numbering about one hundred head.

Job III-D: Inactive.

Job III-E: Inactive.

Work Plan IV: Range Inspection and Browse Measurements As Well As Transect and Exclosure Observations.

Job IV-A: Inactive during report period.

Job IV-B: Range condition survey.

1. Data collected continuously.

Work Plan V: Experimental Range Improvement.

1. This work to be reported separately.

Work Plan VI: Moose investigations.

Job VI-A: Progressing.

1. Stillwater moose investigation - Job Completion Report attached.

2. Gallatin moose investigation.

    a. From observations during hunting seasons as many moose have been killed accidentally as there are harvested by permit. This loss of course has disrupted management procedure.
    b. Seven winter kill were found on the Gallatin this past winter.
    c. Moose numbers have decreased to the point that a harvest is no longer recommended.

Work Plan VII: Rocky Mountain Goat Investigations.

Job VII-A: Crazy Mountain goat investigations - progressing.

1. Two Montana State College students, Jack Lentfer and Jack Saunders, are continuing work on two thesis subjects plus recording all other goat data and any other information gained on any other big game species.

Work Plan VIII: Rocky Mountain Sheep Investigations.

Job VIII-A: Beartooth Range - progressing.

1. From the concentration of bighorns at the mouth of Stillwater Canyon, it is felt that some of these animals could provide a nucleus for a transplanted herd.

2. The big game closures at the mouth of Stillwater Canyon and the West Rosebud Canyon have been recommended abandoned to alleviate competition between mule deer and bighorn sheep.

Job VIII-B: Inactive.

Job VIII-C: Progressing.

1. Thirty-nine Rocky Mountain bighorn sheep were counted on the Deer Creek herd, West Gallatin Canyon, ten young were observed in April.

Job VIII-D: Inactive.

Job VIII-E: Inactive.

Submitted by:	Approved by:
Name J. E. Gaab	Montana State Department of Fish & Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 35-R-3 Work Plan No. I Job No. I-D

Title of Job: Elk Winter Study Upper Gallatin

OBJECTIVES: To obtain information for all phases of management.

PROCEDURE: Work assigned to: Norman Wortman - Fieldman
temporary assistants as needed.
All work was accomplished on the ground with the help of a snow toboggan. Aerial reconnaissance was attempted but proved unsatisfactory due to the distribution of game in the timbered areas.
An experimental feeding program was inaugurated to determine its usefulness during extreme wintering conditions.
February 10th continuous observations started.
February 10th to 24th was spent locating elk and determining which animals it was going to become necessary to feed. During this period 100 bales of hay were fed to isolated calf elk.
February 24th a full scale feeding operation was under way.

FINDINGS:

1. Feeding Records.

FEEDING RECORDS

GALLATIN EXPERIMENTAL EMERGENCY ELK FEEDING PROGRAM

February 24, 1952 to April 12, 1952

Feeding Station No. Elk & Deer per Station	Mar.1	Mar.2	Mar.3	Mar.4	Mar.5
W.Fork Springs Elk-48 12 calves Deer-10	3 bales 30 lb. molassas cake		3 bales 25 lb. cake		3 bales no cake

Feeding Station No. Elk & Deer per Station	Mar.1	Mar.2	Mar.3	Mar.4	Mar.5
Porcupine Meadow Elk-150, 30 calves Deer-None	4 bales 20 lbs. pellets		4 bales 25 lbs. cake		5 bales 45 lbs. cake
Porcupine Creek Elk-40, 8 calves Deer-25	3 bales 20 lbs. pellets		3 bales 10 lbs. cake		3 bales 25 lbs. cake
Lydle Point Elk-30, 6 calves Deer-10	2 bales 10 lbs. cake		2 bales 5 lbs. cake		2 bales no cake
Highway Camp Elk-20, 8 calves Deer-30	2 bales no cake		Hay hadn't been cleaned up	2 bales 15 lbs. cake	
Rainbow Ranch Elk-12, 3 calves Deer-20		1 bale 5 lbs. cake		2 bales 15 lbs. cake	
Buck Creek Elk-18, 5 calves Deer-18		2 bales 15 lbs. cake		2 bales 15 lbs. cake	
Elkhorn Creek Elk-8, 3 calves Deer-None		1 bale 5 lbs. cake		2 bales 20 lbs. cake	
Stansbury Cabin Elk-10,2 calves Deer-5		1 bale 15 lbs. cake		2 bales 20 lbs. cake	
Opposite Buffalo Horn Elk-30, 12 calves Deer-None		2 bales no cake		2 bales 25 lbs. cake	
Buffalo Horn Elk-45, 15 calves Deer-None		3 bales no cake		3 bales 30 lbs. cake	
Mouth of Taylor Elk-16, 4 calves Deer-None					
Cinnamon Creek Elk-3 calves Deer-None					

Feeding Station No. Elk & Deer per Station	Mar.6	Mar.7	Mar.8	Mar.9	Mar.10
W. Fork Springs Elk-48, 12 calves Deer-10		3 bales no cake		3 bales no cake	
Porcupine Meadow Elk-150, 30 calves Deer-None		6 bales 50 lbs. cake		6 bales 20 lbs. cake	
Porcupine Creek Elk-40, 8 calves Deer-25		3 bales 20 lbs. cake		3 bales no cake	
Lydle Point Elk-30, 6 calves Deer-10		2 bales 10 lbs. cake		Elk moved up creek to Porcupine area	
Highway Camp Elk-20, 8 calves Deer-30		2 bales 20 lbs. cake		Hay left over	2 bales 20 lbs. cake
Rainbow Ranch Elk-12, 3 calves Deer-20		1 bale 10 lbs. cake		1 bale no cake	Hay left over
Buck Creek Elk-18, 5 calves Deer-18	1 bale 20 lbs. cake		2 bales 20 lbs. cake		2 bales 20 lbs. cake
Elkhorn Creek Elk-8, 3 calves Deer-None	1 bale 20 lbs. cake		2 bales 20 lbs. cake	Varying the cake feeding to see if they are cleaning it up good and also how much cake they will eat.	Ice went out of river Couldn't get across
Stansbury Cabin Elk-10, 2 calves Deer-5	1 bale 20 lbs. cake		Hay left over		2 bales 25 lbs. cake
W. of Buffalo Horn Elk-30, 12 calves Deer-None	1 bale 20 lbs. cake		3 bales 30 lbs. cake		2 bales 25 lbs. cake
Buffalo Horn Elk-45, 15 calves Deer-None	3 bales 20 lbs. cake		3 bales 20 lbs. cake		3 bales 35 lbs. cake
Mouth of Taylor Elk-16, 4 calves Deer-None				Can't get these elk to come to hay	
Cinnamon Creek Elk-3 calves Deer-None			1 bale	Elk keep moving from one area to another	

Feeding Station No. Elk & Deer per Station	Mar.11	Mar.12	Mar.13	Mar.14	Mar.15
W.Fork Springs Elk-48, 12 calves Deer-10	3 bales no cake			3 bales 25 lbs. cake	
Porcupine Meadow Elk-150, 30 calves Deer-None	6 bales no cake		Did not feed this day	6 bales 50 lbs. cake	Did not feed this day
Porcupine Creek Elk-40, 8 calves Deer-25	3 bales no cake			3 bales 20 lbs. cake	
Lydle Point Elk-30, 6 calves Deer-10	2 bales no cake			2 bales 10 lbs. cake	
Highway Camp Elk-20, 8 calves Deer-30		2 bales 20 lbs. cake		2 bales 10 lbs. cake	
Rainbow Ranch Elk-12, 3 calves Deer-20		Elk apparently moved out		1 bale 10 lbs. cake	
Buck Creek Elk-18, 5 calves Deer-18		2 bales 20 lbs. cake		2 bales 20 lbs. cake	
Elkhorn Creek Elk-8, 3 calves Deer-None		2 bales 20 lbs. cake		These elk have moved up to the Stansbury cabin	
Stansbury Cabin Elk-10, 2 calves Deer-5				2 bales 20 lbs. cake	
W. of Buffalo Horn Elk-30, 12 calves Deer-None		2 bales 20 lbs. cake		3 bales 30 lbs. cake	
Buffalo Horn Elk-45, 15 calves Deer-None		3 bales 20 lbs. cake		3 bales 35 lbs. cake	
Cinnamon Creek Elk-3 calves Deer-None					
Mouth of Taylor Elk-16, 4 calves Deer-None					

Feeding Station No. Elk & Deer per Station	Mar.16	Mar.17	Mar.18	Mar.19	Mar.20
W. Fork Springs Elk-48, 12 calves Deer-10	3 bales 25 lbs. cake		3 bales 25 lbs. cake		
Porcupine Meadow Elk-150, 30 calves Deer-None	6 bales 25 lbs. cake		6 bales 50 lbs. cake		
Porcupine Creek Elk-50, 8 calves Deer-25	3 bales no cake		3 bales 20 lbs. cake		Did not feed on this date
Lydle Point Elk-30, 6 calves Deer-10	2 bales no cake		2 bales 10 lbs. cake		
Highway Camp Elk-20, 8 calves Deer-30	2 bales 20 lbs. cake			2 bales 20 lbs. cake	
Rainbow Ranch Elk-12, 3 calves Deer-20	No sign of elk			Hay left over	
Buck Creek Elk-18, 5 calves Deer-18		2 bales 20 lbs. cake		2 bales 20 lbs. cake	
Elkhorn Creek Elk-8, 3 calves Deer-None					
Stansbury Cabin Elk-10, 2 calves Deer-5		1 bale no cake		1 bale no cake	
W. of Buffalo Horn Elk-30, 12 calves Deer-None		2 bales 20 lbs. cake		2 bales 25 lbs. cake	
Buffalo Horn Elk-45, 15 calves Deer-None		3 bales 25 lbs. cake		3 bales 25 lbs. cake	
Cinnamon Creek Elk-3 calves Deer-None					
Mouth of Taylor Elk-16, 4 calves Deer-None					

Feeding Station No. of Elk & Deer per Station	Mar.21	Mar.22	Mar.23	Mar.24	Mar.25
W. Fork Springs Elk-48, 12 calves Deer-10		3 bales no cake			3 bales no cake
Porcupine Meadows Elk-150, 30 calves Deer-None		7 bales 50 lbs. cake			7 bales 30 lbs. cake
Porcupine Creek Elk-40, 8 calves Deer-25		3 bales 30 lbs. cake	We had a raging blizzard which lasted two days. We didn't feed because the elk were bedded down in the heavy timber and the hay would very likely be wasted. We had approximately 30 inches of new snow making it very difficult to get the hay to the elk.		4 bales 10 lbs. cake
Lydle Point Elk-30, 6 calves Deer-10		Moved up Porcupine Creek			Feeding these elk on Porcupine Creek
Highway Camp Elk-20, 8 calves Deer-30		2 bales 15 lbs. cake			2 bales no cake
Rainbow Ranch Elk-12, 3 calves Deer-20		Elk moved up country			Elk still in timber after snowstorm
Buck Creek Elk-18, 5 calves Deer-18	2 bales 20 lbs. cake				2 bales no cake
Stansbury Cabin Elk-18, 5 calves Deer-5	2 bales 20 lbs. cake				
W. of Buffalo Horn Elk-30, 12 calves Deer-None	2 bales 20 lbs. cake				
Buffalo Horn Elk-45, 15 calves Deer-None	3 bales 20 lbs. cake				
Cinnamon Creek Elk-3 calves Deer-None					
Mouth of Taylor Elk-16, 4 calves Deer-None	1 bale no cake				

Feeding Station No. Elk & Deer per Station	Mar.26	Mar.27	Mar.28	Mar.29	Mar.30
W. Fork Springs Elk-48, 12 calves Deer-10		3 bales 25 lbs. cake		3 bales 20 lbs. cake	
Porcupine Meadows Elk-150, 30 calves Deer-None		6 bales 50 lbs. cake		4 bales 35 lbs. cake	
Porcupine Creek Elk-40, 8 calves Deer-25		4 bales 40 lbs. cake		4 bales 30 lbs. cake	
Highway Camp Elk-20, 8 calves Deer-30		2 bales 20 lbs. cake		2 bales 15 lbs. cake	
Rainbow Ranch Elk-12, 3 calves Deer-20			2 bales no cake		1 bale 5 lbs. cake
Buck Creek Elk-18, 5 calves Deer-18		2 bales 20 lbs. cake	2 bales 20 lbs. cake		2 bales 25 lbs. cake
Stansbury Cabin Elk-18, 5 calves Deer-5	2 bales Ran out of cake		2 bales no cake		2 bales 20 lbs. cake
W. of Buffalo Horn Elk-30, 12 calves Deer-None	3 bales		2 bales 15 lbs. cake		3 bales 15 lbs. cake
Buffalo Horn Elk-45, 15 calves Deer-None	4 bales		3 bales 15 lbs. cake		3 bales 15 lbs. cake
Cinnamon Creek Elk-3 calves Deer-None			Hay remained from last feeding		2 bales 10 lbs. cake
Mouth of Taylor Elk-16, 4 calves Deer-None			2 bales no cake		Hay remained from last feeding
Snowflake Springs Elk-4 cows Deer-None			1 bale no cake		

Snowflake Springs feeding
area was a complete failure.

Feeding Station No. Elk & Deer per Station	Mar.31	Apr.1	Apr.2	Apr.3	Apr.4
W. Fork Springs Elk-48, 12 calves Deer-10	3 bales 25 lbs. cake		3 bales 25 lbs. cake		3 bales 20 lbs. cake
Porcupine Meadows Elk-150, 30 calves Deer-None	4 bales 25 lbs. cake		4 bales 25 lbs. cake		4 bales 20 lbs. cake
Porcupine Creek Elk-70, 14 calves Deer-35	6 bales 50 lbs. cake	2 bales no cake*	4 bales 20 lbs. cake		4 bales 20 lbs. cake
Highway Camp Elk-20, 8 calves Deer-30	2 bales no cake		2 bales 20 lbs. cake		2 bales 20 lbs. cake
Rainbow Ranch Elk-12, 3 calves Deer-20		1 bale no cake		1 bale 10 lbs. cake	
Buck Creek Elk-18, 5 calves Deer-18		2 bales no cake		2 bales 20 lbs. cake	
Stansbury Cabin Elk-18, 5 calves Deer-5		2 bales no cake		2 bales 20 lbs. cake	
W. of Buffalo Horn Elk-30, 12 calves Deer-None		2 bales no cake		3 bales 30 lbs. cake	
Buffalo Horn Elk-45, 15 calves Deer-None		3 bales no cake		3 bales 20 lbs. cake	
Cinnamon Creek Elk-3 calves Deer-None		Hay left over		1 bale 10 lbs. cake	
Mouth of Taylor Elk-16, 4 calves Deer-None		2 bales no cake These elk won't eat cake		2 bales no cake	

*Because of a complaint made by George Bowles, we fed every day to keep elk away from Bowles' feed lot.

Feeding Station No. Elk & Deer per Station	Apr.5	Apr.6	Apr.7	Apr.8	Apr.9
W. Fork Springs Elk-48, 12 calves Deer-10		3 bales 20 lbs. cake		3 bales 20 lbs. cake	
Porcupine Meadows Elk-150, 30 calves Deer-None		4 bales no cake		Hay untouched	
Porcupine Creek Elk-70, 14 calves Deer-35		4 bales no cake		4 bales 20 lbs. cake	
Highway Camp Elk-20, 8 calves Deer-30		3 bales no cake	Did not feed on this date.	2 bales 20 lbs. cake	
Rainbow Ranch Elk-12, 3 calves Deer-20	1 bale 5 lbs. cake	1 bale		hay untouched	
Buck Creek Elk-18, 5 calves Deer-18	2 bales 20 lbs. cake	2 bales			1 bale no cake
Stansbury Cabin Elk-18, 5 calves Deer-5	Hay remained from last feeding	2 bales no cake			Hay untouched
W. of Buffalo Horn Elk-30, 12 calves Deer-None	3 bales 30 lbs. cake	2 bales no cake			
Buffalo Horn Elk-45, 15 calves Deer-None	3 bales 20 lbs. cake	3 bales			2 bales no cake
Cinnamon Creek Elk-3 calves Deer-None	Hay remained from last feeding	Elk have moved out			Hay untouched
Mouth of Taylor Elk-16, 4 calves Deer-None		2 bales no cake			

Feeding Station No. Elk & Deer per Station	Apr.10	Apr.11	Apr.12
W. Fork Springs Elk-48, 12 calves Deer-10	3 bales 20 lbs. cake		3 bales 20 lbs. cake
Porcupine Meadows Elk-150, 30 calves Deer-None	Hay untouched		Hay untouched
Porcupine Creek Elk-70, 14 calves Deer-None	3 bales 20 lbs. cake		Hay untouched
Highway Camp Elk-20, 8 calves Deer-30	Hay untouched	Did not feed on this date	2 bales no cake
Rainbow Ranch Elk-12, 3 calves Deer-20			1 bale no cake
Buck Creek Elk-18, 5 calves Deer-18			Hay untouched
Stansbury Cabin Elk-18, 5 calves Deer-5			Hay untouched
W. of Buffalo Horn Elk-30, 12 calves Deer-None			2 bales no cake
Buffalo Horn Elk-45, 15 calves Deer-None			2 bales No cake
Cinnamon Creek Elk-3 calves Deer-None			Hay untouched
Mouth of Taylor Elk-16, 4 calves Deer-None			Hay untouched

2. Available browse in vicinity of feeding stations.

West Fork Springs - Willow
Porcupine Meadows - Willow and conifers
Porcupine Creek - Willow and conifers
Highway Camp - Willow and sage
Rainbow Ranch - Pawing for grass and forbes for browse
Buck Creek - Conifers
Elkhorn Creek - Conifers
Stansbury Cabin - Conifers
W. Side River at Mouth of Buffalohorn Creek - Aspen and sage
Buffalo Horn Creek - Willow and conifers
Mouth of Taylor Fork - Sage and conifers
Snow Flake Springs - Willow and water cress

3. Because of excessive snow depths, 50% above normal, very little forage was obtained by pawing for ground growth by those animals confined to the river bottom.

4. Approximately 430 elk were fed throughout the period February 24th to April 12th. Approximately 111 of the total were calves.

5. The calves appeared to get their share of the feed by coming into the stations before the mature animals. Most of the stations were close enough to the highway and other activity that the mature elk were reluctant to appear on the stations as soon as the less alert calves.

6. After experimental feeding operations started, winter loss was minimized until a raging storm and 30" of new snow on the 23rd and 24th of March. By this time the elk winter tick (Dermacantor albipictus) had become quite active. Due to the heavy infestation of ticks combined with this storm and the lessened mobility of the elk, heavy losses occurred.

1951-52 WINTER KILL REPORT

Drainage	Calves M	Calves F	Cows	Uncl.	Spike	Mature Bulls	Deer	Moose
Asbestos Creek				3			5	
Beaver Creek		1	1	4				
Buck Creek	3	2					2	
Buffalo Horn	2	2		2	1			
W. Side of River from Buffalo Horn	2							
Cinnamon Creek	2							

Drainage	Calves		Cows	Uncl.	Spike	Mature Bulls	Deer	Moose
	M	F						
Adley Creek	3			2			28	
Deer Creek				1			19	
Elenenski Creek				3	1			
Elkhorn Creek	1	1						
Porcupine Creek	11	17	6	10	1	3	21	1
Portal Creek								1
Rainbow Mountain	1	8	1	6	1	3	14	
Jack Smith Bridge	2		1			4	3	
Snow Flake Spring	1		4	1	1	1		
Sage Creek		3	1					
Squaw Creek							6	
Sage Brush Point								1
West Fork Springs	11	8	7		1	1	8	
West Fork Creek						2	9	2
Tepee Creek		1	1	2				
Yellowstone Park		4	5	19	2	8		2
Lodge Pole Creek				2				
Sawmill Creek				1				
Wapiti Creek				1				
Taylor's Fork	1	3	7	31	2	1	1	
Total	40	50	34	88	10	23	116	7

Grand Total Actually Counted

116 Deer
245 Elk
7 Moose
2 Bear (Daly Creek and Fan Creek)

RECOMMENDATIONS:

1. It has become apparent through several years observations that regardless of the total number of elk, every few years snow depths and severe winter weather conditions will cause a loss of big game.

   a. Without providing emergency elk range on the Madison River through land acquisition, steps must be taken to be prepared to provide artificial feed during periods of severe wintering conditions for elk within the West Gallatin drainage. Information to date indicates that a herd of 1500 elk can be considered as carrying capacity during normal conditions when natural forage is available. When the natural forage is not available due to icing conditions following a mid-winter chinook or extreme snow depths, it appears necessary to decrease winter losses by providing artificial feed under proper supervision.

Submitted by J. E. Gaab Approved by Robert F. Cooney
Date July 11, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 35-R-3 Work Plan No. I Job No. 1-E

Title of Job: Big Game Survey in Madison-Harrison Antelope Census

OBJECTIVES:

To determine current big game population and distribution on this important range. Records of weather, game conditions and other critical information will be taken to correlate with census data. Management recommendations will be submitted from current findings.

PROCEDURE: Aerial census.

FINDINGS:

1. One hundred and eighty five antelope were counted.
    a. Area: Madison River on the east, Bozeman-Norris road on the south, Highway No. 1 on the west, Highway 10 on the north.

RECOMMENDATIONS:

1. That an annual harvest begin during the 1952 hunting season.

Submitted by: J. E. Gaab Approved by: Robert F. Cooney

Date: July 10, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 35-R-3 Work Plan No. III Job No. III-A

Title of Job: West Gallatin Calf Elk Tagging

OBJECTIVES:

To tag and release as many calf elk as possible on the calving ranges of both the Gallatin and Yellowstone drainages.

Individually recognizable plastic tags to be used.

Recover tags at checking stations and also obtain as much field observation data as possible.

PERSONNEL:

Norman Wortman
Dick Hodder
Bill Keezer

PROCEDURE:

The Gallatin Park Station was used as quarters through the courtesy of Yellowstone National Park. Department personnel covered the calving grounds on horseback.

FINDINGS:

1. Number of calves tagged - 114

    a. 59 female
    55 male

2. Plastic symbols placed in right ear on females and on left ear of males.
Red one-half circle symbols were used on calves tagged in the west side of the river, from Monument to Taylor Fork.
Red squares were used on calves tagged on the east side of the river from Black Butte to Tepee Creek.
Red triangles were used on calves tagged on the east side of the river from Specimen to Fan Creek.
Green half circles were used on calves tagged in Fan Creek and the Upper Gallatin River.

Green squares were used on calves tagged in Taylor's Fork. Green triangles were used on calves tagged from Black Butte to Specimen.

3. Calves tagged 1952. (Ear-tagging record attached)

4. Calves were found at higher elevations within the calving grounds than usual.

5. Calves seemed to have been dropped earlier. The job was completed earlier than usual because the calves were too large to catch.

6. Two calves were found that had fallen prey to coyotes.

7. This was a record catch despite the fact that the total elk population was at a minimum due to a heavy hunter harvest plus an excessive winter loss.

RECOMMENDATIONS:

1. No change in procedure.

Submitted by J. E. Gaab Approved by Robert F. Cooney

Date July 10, 1952

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1840R 1841L	5/28/52	F	3to4	Lodge Pole Cr.				
E-1849R 1850L	5/28/52	F	2-3	Monument Cr.				
E-1843R 1844L	5/28/52	M	2-3	Monument Cr.				
E-1851L 1850R	5/29/52	M	2-3	Daly Cr.				
E-1829R 1828L	5/29/52	F	4-5	Daly Cr.				
E-1830L 1831R	5/29/52	M	5-6	Daly Pass				
E-1833L 1832R	5/29/52	M	3-4	Daly Pass				
E-1835R 1834L	5/29/52	F	1	Daly Cr.				
E-1836L 1837R	5/29/52	M	3-4	Daly Cr.				
E-1838R 1839L	5/29/52	F	6	Daly Cr.				
E-1856L 1855R	5/29/52	M	6	Daly Cr.				
E-1858L 1857R	5/29/52	M	5-6	Daly Cr.				
E-1853L 1854R	5/29/52	M	4-5	Daly Cr.				
E-1838R 1839L	5/29/52	F	6	Daly Cr.				

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1881R 1880L	5/30/52	F	5-6	Mouth Daly Cr.				
E-1842R 1863L	5/30/52	F	3	Daly Cr.				
E-1882L 1883R	5/30/52	M		Daly Cr.				
E-1885L 1884R	5/30/52	M	3	Daly Cr.				
E-1887L 1886R	5/30/52	M	3-4	Daly Cr.				
E-1890R 1891L	5/30/52	F	4-5	Daly Cr.				
E-1893R 1892L	5/30/52	F	3-4	Daly Cr.				
E-1888R 1889L	5/30/52	F	4-5	Daly Cr.				
E-1898L 1899R	5/30/52	M	8 hrs.	Daly Cr.				
E-1866R 1867L	5/30/52	F	4-5	Daly Cr.				
E-1842R 1863L	5/30/52	F	3	Daly Cr.				
E-1871R 1870L	5/30/52	F	5-6	Daly Cr.	Right ear was cut near base and had scar from right ear across skull towards left ear.			

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1874L 1875R	5/31/52	M	1½	(Taylors Fork) Lincoln Mt.				
E-1908L 1907R	5/31/52	M	4-5	Meadow Cr.	Lower jaw protrudes farther than upper and gives a buck tooth effect.			
E-1942R 1943L	6/1/52	F	4-5	Gallatin R. (¼ mile above Gallatin Sta.)				
E-1949L 1950R	6/1/52	M	3-4	Wickiup Cr.				
E-1947R 1948L	6/1/52	F	5-7	Specimen Cr.				
E-1946L 1945R	6/1/52	M	12 Hrs.	Gallatin R. (¼ mile above Snowslide Cr.)				
E-1903L 1904R	6/1/52	M	5-6	Gallatin R. (½ mile below Bacon Rine Cr.)				
E-1942R 1941L	6/2/52	F	7-8	Story Flat				
E-1940R 1939L	6/2/52	F	3-4	Sawmill Gulch				
E-1873R 1872L	6/2/52	F	4-5	Sawmill Gulch				
E-1895R 1894L	6/2/52	M	4	Sawmill Gulch				

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1937L 1938R	6/2/52	M	7	Sawmill Gulch				
E-1936L 1935R	6/2/52	M	7	Sawmill Gulch				
E-1933L 1934R	6/2/52	M	7-8	Lodge Pole Cr.				
E-1910L 1909R	6/2/52	M	7-8	Lodge Pole Cr.				
E-1927R 1926L	6/2/52	F	7-8	Lodge Pole Cr.				
E-1919L 1918R	6/2/52	M	5-6	Gallatin River (Opposite Tepee Cr.)				
E-1906L 1905R	6/2/52	M	6-7	Gallatin River (¼ mi. below Gall. Ranger Sta.)				
E-1896R 1897L	6/2/52	F	3-4	Sawmill Gulch				
E-1931L 1930R	6/3/52	M	6-7	Daly Cr.				
E-1861R 1859L	6/3/52	F	6-7	Daly Cr.				
E-1878L 1879R	6/3/52	M	4-5	Crown Butte				
E-1928L 1929R	6/3/52	M	1 Hr.	Daly Cr.				
E-1916R 1917L	6/3/52	F	7-8	Daly Cr.				
E-1877R 1862L	6/3/52	F	4-5	Daly Cr.				
E-1951L 1952R	6/3/52	M	3-4	Daly Cr.				

ELK EAR-TAGGING RECORDS

Gallatin Canyon - 1952
(Spring)

	Tagging Record					Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1948L 1960R	6/3/52	M	6-7	Tepee Pass				
E-1954R 1953L	6/4/52	F	2-3	Forks of Fan Cr.				
E-1955L 1956R	6/4/52	M	5-6	South Fork Fan Cr.				
E-1959L 1958R	6/4/52	M	6	South Fork Fan Cr.				
E-1962R 1963L	6/4/52	F	6-7	South Fork Fan Cr.				
E-1960R 1961L	6/4/52	F	12 Hr.	South Fork Fan Cr.				
E-1969L 1970R	6/4/52	M	1½	South Fork Fan Cr.				
E-1923R 1920L	6/4/52	F	2-3	South Fork Fan Cr.				
E-1961R 1966L	6/4/52	F	6	South Fork Fan Cr.				
E-1912R 1846L	6/4/52	F	7-8	South Fork Fan Cr.				
E-1917L 1973R	6/4/52	M	2-3	Forks of Fan Cr.				
E-1868L 1914R	6/4/52	M	4-5	Fan Cr.				
E-1913L 1915R	6/4/52	M	4	Fan Cr.				
E-1845L 1925R	6/4/52	M	6	Fan Cr.				

ELK EAR-TAGGING RECORDS

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
E-1978R 1979L	6/6/52	F	5-6	Daly Cr.				
E-1911L 1922R	6/6/52	M	8 Hrs.	Daly Cr.				
E-1996L 1995R	6/6/52	M	3-4	Daly Cr.				
E-1975L 1974R	6/6/52	M	4-5	Daly Cr.				
E-1980L 1981R	6/6/52	M	5-6	Daly Cr.				
E-1976L 1977R	6/6/52	M	5-6	Daly Cr.				
E-1982R 1983L	6/6/52	F	5-6	Daly Cr.				
E-1987R 1921L	6/6/52	F	7-8	Daly Cr.				
E-1869R 1988L	6/6/52	F	4	Daly Cr.				
E-1989L 1986R	6/6/52	M	5-6	Daly Cr.				
E-1984R 1985L	6/6/52	F	6-7	Daly Cr. & Tepee Pass				
E-1971R 1968L	6/6/52	F	6-7	Wickiup Cr. Opposite Gall. Sta.				
E-1955R None	6/6/52	F	3-4	Wickiup Cr. Opposite Gall. Sta.				
C-390R None	6/7/52	F	6-7	Head of Wickiup Cr.				
C-385R None	6/8/52	F	4-5	Fan Cr.				

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
C-386R None	6/8/52	F	6-7	Fan Cr.				
E-1998L None	6/8/52	M	3-4	Fan Cr.				
C-381R None	6/8/52	F	2-3	South Fork Fan Cr.				
E-1999R None	6/8/52	F	1½	Fan Cr.				
E-1994R None	6/9/52	F	7-8	Story Flat				
E-1847L None	6/9/52	M	4-5	Mouth of Monument Cr.				
C-393L None	6/9/52	M	6-7	Mouth of Monument Cr.				
E-1993R None	6/9/52	F	5-6	Mouth of Monument Cr.				
E-1924R None	6/9/52	F	7-8	Sawmill Gulch				
C-387R 382L	6/10/52	F	4	Daly Cr.				
C-384R 383L	6/10/52	F	4	Daly Cr.				
C-397R 388L	6/10/52	F	3	Daly Cr.				
C-389R *YNP-1038L	6/10/52	F	7-8	Daly Cr. & Black Butte Pass				
E-1990R 1991L	6/10/52	F	7-8	Daly Cr.				
C-392R 391L	6/10/52	F	3-4	Daly Cr.				

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
C-380R 396L	6/10/52	F	4-5	Daly Cr.				
*YNP-1039L 1037R	6/10/52	M	2-3	Daly Cr.				
*YNP-1036L 1040R	6/10/52	M	7-8	Tepee Cr.				
*YNP-1029L 1028R	6/10/52	M	5-6	Daly Cr.				
*YNP-1032R 1033L	6/10/52	F	5-6	Daly Cr.				
*YNP-1031R 1030L	6/10/52	F	3-4	Daly Cr.				
C-394R 395L	6/10/52	F	4-5	Daly Cr.				
*YNP-1042L 1041R	6/10/52	M	7-8	Daly Cr.				
*YNP-1035L 1034R	6/10/52	M	1-2	Daly Cr.				
*YNP-1044L 1045R	6/11/52	M	6-7	Fan Cr.				
*YNP-1048R 1041L	6/11/52	F	3-4	Fan Cr.				
*YNP-1052L 1053R	6/11/52	M	2	Fan Cr.				
*YNP-1055R 1054L	6/11/52	F	4-5	Fan Cr.				
*YNP-1057L 1056R	6/11/52	M	3	Fan Cr.				

ELK EAR-TAGGING RECORD

Gallatin Canyon - 1952
(Spring)

		Tagging Record				Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
*YNP-1059R 1058L	6/11/52	F	4	Fan Creek				
*YNP-1061L 1060R	6/11/52	M	6-7	Fan Creek				

Male - 55 Female - 59 Total - 114

* All tags listed as YNP have (return to Y.N.P. Yellowstone Park Wyoming).

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 35-R-3 Work Plan No. III Job No. III-A

Title of Job: Yellowstone Calf Elk Tagging

OBJECTIVES:

To tag and release as many calf elk as possible on the calving ranges of both the Gallatin and Yellowstone drainages.

Individually recognizable plastic tags to be used.

Recover tags at checking stations and also obtain as much field observation data as possible.

PERSONNEL:

Jack Lentfer
Frank Cunningham
Phil South - part time

PROCEDURE:

The crew quartered at Mammoth Hot Springs and used Park horses as usual.

FINDINGS:

1. Number of calves tagged - 24
    a. 16 males
       8 females
2. Red, white and blue square symbols were put on the right ear below Snow Pass and on the left ear above Snow Pass.
3. About one-half the elk were observed during this calving period which can be attributed to the heavy harvest during the fall of 1951.
4. Two losses among the calves were observed, one coyote kill and the other appeared to be a still birth.

5. A small group of elk had migrated both directions over Bighorn Pass by June 10th. No elk had migrated over Stellaria Pass and the sign was quite abundant going both ways over Fawn Pass.

RECOMMENDATIONS:

1. That this phase of the migration study be discontinued until the total elk population of the Gardiner herd increases.

Submitted by: J. E. Gaab Approved by: Robert F. Cooney

Date: July 10, 1952

ELK EAR-TAGGING RECORD

*R - right ear
*L - left ear

Yellowstone Park - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
YNP-1101R* 1102L*	5/27/52	M	1	Slide Lake				
YNP-1103R 1104L	5/28/52	F	2	Slide Lake				
YNP-1105R 1106L	5/28/52	M	8	Slide Lake				
YNP-1108R 1109L	5/28/52	F	3	Slide Lake				
YNP-1110R 1111L	5/29/52	M	2	Stevens Cr.				
YNP-1112L 1113R	5/29/52	F	4	Panther Cr.				
YNP-1114L 1115R	5/30/52	M	4	Reese Cr.				
YNP-1116R 1117L	6/3/52	M	7	Stevens Cr.				
YNP-1119L 1120R	6/7/52	M	3	Stevens Cr.				
YNP-1121L 1144R	6/9/52	F	14	Panther Cr.				
YNP-1122R 1123L	6/8/52	F	6	Reese Cr.				
YNP-1124R 1125L	6/2/52	M	4	Glen Cr.				
YNP-1126L 1127R	5/28/52	F	3	Slide Lake				
YNP-1128R 1129L	5/29/52	M	3	Ice Lake				
YNP-1130R 1131L	5/31/52	M	4	Reese Cr.				

ELK EAR-TAGGING RECORD

Yellowstone Park - 1952
(Spring)

Tagging Record						Recovery Record		
Tag No.	Date Tagged	Sex	Age in Days	Location Tagged	Remarks	Date Taken	By Whom Taken	Location Taken
YNP-1132R 1133L	6/3/52	M	4	Stevens Cr.				
YNP-1134R 1135L	6/3/52	M	4	Rainbow Lake				
YNP-1136R 1137L	6/3/52	M	5	Rainbow Lake				
YNP-1139L 1140R	6/5/52	F	21	Rainbow Lake				
YNP-1142R 1143L	6/7/52	M	8	Stevens Cr.				
YNP-1145L 1146R	6/9/52	M	8	Panther Cr.				
YNP-1147L 1148R	6/10/52	M	14	Panther Cr.				
YNP-1149L 1150R	6/10/52	M	14	Fawn Cr.				
YNP-1215L 1216R	6/11/52	F	14	Panther Cr.				

Male - 16 Female - 8 Total - 24

All tags have (Return to Y.N.P. Yellowstone Park Wyoming) written on them.

AMENDMENT TO WORK PLAN

State of Montana

Project No. 35-R-3 Work Plan III Job No. III-F

Title of Job: Manipulating Big Game Populations

OBJECTIVES:

To encourage big game animals to change their feeding pattern and to gain better distribution over available ranges.
To lessen damage to private property.
To aid hunters or to provide more protection for game.

PROCEDURE:

1. Provide salt at strategic sites and at different periods of the year.

2. Manipulation of hunting pressure.

3. Land acquisition and fencing.

4. Experimental drifting of animals by plane or by manpower.

WORK SCHEDULE: Year around.

WORK LOCATION: Entire unit.

WORK ASSIGNMENT: J. E. Gaab with temporary assistance as needed.

Submitted by: J. E. Gaab Approved by: Robert F. Cooney

Date: July 15, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 35-R-3 Work Plan No. IV Job No. IV-A

Title of Job: Stillwater Moose Investigation

OBJECTIVES:

Census moose in all important areas and determine their year round range.

PERSONNEL:

Ed Slusher - District Forest Ranger
Jack Curtis - Custer National Forest Supervisor
J. E. Gaab

PROCEDURE:

A general inspection of moose browse and moose sign observed by riding horseback through the area and comparing with previous moose survey.

FINDINGS:

1. Moose habitat is limited and must therefore be protected to perpetuate a moose population.
2. From the amount of use on key browse species it is concluded that the moose population has reached the saturation point.
3. As many individual moose were accounted for by riding up the river to Big Park as was accounted for throughout the entire area on a complete survey three years ago.
4. Found one calf moose carcass, may have been a lion kill.

RECOMMENDATIONS:

1. That harvest of mature bulls be renewed during the 1952 hunting season.

Submitted by: J. E. Gaab Approved by: Robert F. Cooney

Date: July 10, 1952

STATE Montana
PROJECT NO. 37-R-3
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required by

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Game Range Development Survey

2. Leader: R. L. Hodder, Range Biologist

3. Tech. Assistant: Carter Rubottom

4. Report of Progress:

Work Plan I: Gallatin Elk Range

Job 1-A: Range (forage inventory) Survey

The forage map has been completed. An over-lay map has been finished which shows the available winter **range** during each of the winter months. Compilation of surface acres and forage acres in these areas available during each of the winter months is completed. Palatability tables for both elk and cattle were reviewed and corrected. A forage acre requirement for elk is yet to be determined.

Job I-B: Forage Production and Utilization Transects

Transects were clipped according to plan and stored for drying before weighing. Information obtained during the preceding year was analysed by the U. S. Forest Service Experimental Station at Missoula and returned. This information was found inadequate for a conclusive study, and so the analysis will be repeated next year with sufficient data.

Job 1-C: Spring Use Tests

This project was discontinued until after a more satisfactory method or technique of study is found to gain the desired information.

Job 1-D: Browse Withstandability Tests

Browse withstandability studies on willow, aspen, and sage have been terminated after a continuous five-year study. The data is now being prepared for report. Withstandability tests on willow up Taylor Fork were increased in that locality and also at the mouth of Tepee Creek where several new bushes were marked and measured.

Job 1-E: Photo Plot Transects (Trend Study)

Not active during this period.

Job 1-F: Forage Restoration Studies

All reseeding plots and areas were inspected for winter-kill. Spring reseeding included blue bunch wheatgrass, sunflower-wildoats mixture, yellow sweet clover, blue stem wild rye, and giant wild rye grass. Browse plantings were inspected and checked. Five hundred new cuttings of old man wormwood were put out in the Taylor Fork area, and several species of vine-type creeper plants were placed in locations above sore spots on hillsides up Porcupine Creek. These species include dewberry hops, woodbine, and periwinkle.

Job 1-G: Weather Data

Inactive during this period.

Work Plan II: Sun River Winter Elk Range Acquisition Area

Job 2-A: Range Survey (Forage Inventory)

This project was in the preparatory phase of development during this quarter. Aerial photographs of the area were located and strip maps of the area were obtained along with other necessary materials for the field work which is scheduled to start the beginning of the next quarter.

Work Plan III: Blackfoot Clearwater Game Range
Job 3-A: Inactive during this quarter
Job 3-B: Inactive during this quarter
Job 3-C: Inactive during this quarter

Submitted by:
Name Richard L. Hodder
Title Range Biologist

Approved by:
Montana State Department of Fish and Game
By: Robert F. Cooney, Director
Wildlife Restoration Division
Date July 15, 1952

STATE Montana
PROJECT NO. 38-R-3
DATE July 15, 1952
Vol. III No. II

QUARTERLY PROGRESS REPORT FOR

SURVEYS AND INVESTIGATIONS

As Required by

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Upland Game Bird Survey and Investigation

2. Leader: William R. Bergeson, Biologist

3. Report of Progress:

Work Plan I: Preliminary Investigation of Pheasant Habitat Development Possibilities
Inactive during year.

Work Plan II: Management Study of Prairie Grouse
Job A: Range and Distribution of Prairie Grouse
Progress report attached.

Job B: Population Trends and Breeding Potential
Progress report attached.

Job C: Experimental Management Areas
Proceeding according to schedule.

Job D: Effect of Civilization and Agriculture on Prairie Grouse
Inactive during year.

Job E: Needs for Habitat Development
Inactive during year.

Job F: Life History and Biology
Proceeding according to schedule.

Work Plan III: Management Study of Mountain Grouse
Job A: Range and Relative Density
Proceeding according to schedule.

Job B: Experimental Management Areas
Inactive during report period.

Job C: Ecology and Life Histories
Inactive during year.

Work Plan IV: Ring-necked Pheasant Survey and Investigation
Job A: Study of Breeding Populations and Production
Completion report attached.

Job B: Sex Ratios and Hunter Harvest
Writeup in progress.

Job C: Post Card Survey of Hunter Harvest
Inactive during report period.

Job D: Pheasant Mortality and Causes
Inactive during report period.

Work Plan V: Survival Value of Game Farm Reared Exotics
Job A: Survival of Valley Quail
Inactive during report period.

Job B: Survival of Spring Released Hen Pheasants
Proceeding according to schedule.

Job C: Survival of Chukar Partridges
Progress report attached.

Work Plan VI: Ecological Study of Ring-necked Pheasants in Flathead Valley
A manuscript has been submitted and editing is in progress. This will be submitted as a separate publication.

Submitted by:	Approved by:
Name Wm. R. Bergeson	Montana State Department of Fish & Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. 38-R-3 Work Plan No. IV Job No. IV-A

Title of Job: Pheasant Breeding Populations and Production

PURPOSE:

To determine spring breeding populations, population trends and distribution in the major pheasant producing areas of Montana.

PROCEDURE:

Most crowing count routes established in previous years were retraced and the number of cock calls heard during a two-minute interval were recorded for each listening station.

Usually, the routes were 20 miles long with listening stations at mile intervals. Due to a shortage of funds routes established and conducted by the Missouri River Basin studies, Fish and Wildlife Service, were not conducted this year, nor was it possible for us to run many of these routes because of conflicting schedules.

FINDINGS:

BITTERROOT AREA

A decrease of 19% in the cock pheasant population is indicated from the spring of 1951 to the spring of 1952 based on crowing counts in the Bitterroot Valley. The average number of calls per station heard in 1952 was 13.3 compared to an average of 16.5 heard at similar stations in 1951. The spring sex ratio in this area was not determined. However, the post-season sex ratio in December 1951 was observed to be about two hens per cock.

Table 1 Pheasant Crowing Counts, Bitterroot Valley

Route	1949	1950	1951	1952*
Lower Valley	10.3	10.7	11.8	8.5
Upper Valley	26.5	29.7	21.2	18.0
Average	18.4	20.2	16.5	13.3

*1952 figures adjusted by 20% increase based on test route indication that counts were taken too late in season to get maximum count as in 1951.

KALISPELL AREA

An increase of 20% in cock crowing since last year was noted in the Kalispell area.

Table 2 Pheasant Crowing Counts--Kalispell Area

1949	1950	1951	1952
29.6	24.8	20.9	25.1

FRENCHTOWN AREA

A slight decrease in cock crowing was observed in the Frenchtown area west of Missoula in 1952 compared to 1951 numbers.

Table 3 Pheasant Crowing Counts--Frenchtown Area

1949	1950	1951	1952
10.5	12.4	10.2	10.0

FLATHEAD AREA

About the same average number of cock pheasant calls were noted in the Flathead area in 1952 as in 1951. The route averages varied inversely from last year's results, but the average of the two routes was only slightly higher in 1952. The winter pheasant sex ratio in this area was 1 cock to 3.2 hens compared to a ratio of 1 cock to 2.6 hens in 1951.

Table 4 Pheasant Crowing Counts--Flathead Area

Route	1948	1949	1950	1951	1952*
No. 1	27.5	29.6	29.8	53.3	42.2
No. 2	44.0	41.0	30.2	42.3	54.6

*Counts adjusted by increasing 24% based on decrease from average during maximum crowing period.

FAIRFIELD AREA

The number of pheasant calls decreased from an average 40.9 calls recorded in 1951 to 21.5 calls in 1952, or a decrease of 47.4 per cent. The 1952 spring sex ratio was found to be one cock to 6.9 hens which is a marked shift from the 1951 ratio of one cock to 2.5 hens. The decrease in 1952 is attributed to the 1951 hunting season which was longer in duration and allowed a larger bag limit than any season in recent years, thus harvesting a larger proportion of the cock population in this area.

Table 5 Pheasant Crowing Counts--Fairfield Area

Route	1948	1949	1950	1951	1952
No. 1	30.9	38.1	24.3	54.8	20.8
No. 2	27.9	30.0	29.6	53.3	23.6

CONRAD AREA

Crowing counts decreased from 40.4 in 1951 to 33.9 in 1952, a 16 per cent decrease for the two routes in the Conrad-Valier areas. Of interest is the fact that cock calls decreased 32 per cent on Route 2 which lies in the irrigated portion of the area east of Conrad; Route 1, which is north of Conrad and extends westward toward Valier runs in a large part through a dryland wheat area, indicated a 10 per cent increase in recorded cock calls and probably reflects a wider dispersal of pheasants. The spring sex ratio in this area was found to be one cock to 5.5 hens and indicates a better kill in the 1951 season, which probably accounts for the overall 1952 decrease for the area.

Table 6 Pheasant Crowing Counts--Conrad Area

Route	1949	1950	1951	1952
No. 1	27.9	24.8	28.9	32.0
No. 2	53.6	42.2	51.9	35.9

BILLINGS AREA

Due to conflicting time schedules only one of the Missouri River Basin Studies routes in this area was conducted, and this indicated a continuing decline in the pheasant population since 1948, when crowing count routes were established. It is also believed that these counts were taken too late in the season in this area to coincide with maximum crowing intensity.

Table 7 Pheasant Crowing Counts--Billings Area

Route	1948	1949	1950	1951	1952
No. 2	18.0	11.5	--	11.4	7.0

HARDIN AREA

Crowing counts in this area again were conducted too late in the season to coincide with maximum crowing intensity. However, the counts show a general decrease when compared with previous years, and again probably reflect the effects of a longer hunting season and a larger bag limit.

Table 8 Pheasant Crowing Counts--Hardin Area

Route	1948	1949	1950	1951	1952
No. 1	15.3	17.4	--	19.1	11.3
No. 2	--	23.9	--	8.8	10.3

MILK RIVER AREA

Due to severe flooding on the Milk River and its tributaries which began March 31 and continued throughout April, Missouri River Basin Studies crowing routes were inaccessible or impassable until well into May, by which time it was too late to obtain comparative data. However, the one route conducted on June 4 indicated a 57% decrease in cock populations. Autumn road counts are expected to measure the effect of flooding on pheasant production in the area.

Table 9 Pheasant Crowing Counts--Milk River Area

Route	1950	1951	1952
Malta	16.5	29.6	12.5

HELENA VALLEY

A slight decrease in average calls per two-minute period was noted in the Helena Valley in 1952, averaging 13.5 this spring compared with 15 in 1951.

Table 10 Pheasant Crowing Counts--Helena Valley

1948	1949	1950	1951	1952
10.7	15.3	12.2	15.0	13.5

OTHER AREAS

A number of new routes established last year were re-conducted this spring. These stations all showed a decrease which is attributed to the 1951 hunting season.

Table 11 Pheasant Crowing Counts--Other Areas

Route	1951	1952
Broadwater No. 1	15.4	12.5
Broadwater No. 2	32.0	25.7
Beaverhead	13.2	11.7
Forsyth	25.4	19.0

CONCLUSIONS:

According to crowing count data for most of the important Montana pheasant ranges, there has been a general decline in cock pheasant populations. This is attributed to the larger harvest of cocks during the 1951 season which was longer in duration and allowed four birds in the bag compared with three for the previous year. This belief is substantiated by sex ratio data, particularly in the Fairfield and Conrad areas where the ratio was found to be one cock to 6.9 and 5.5 hens respectively, compared with about 2.4 hens per cock in the spring of 1951.

With favorable hatching and rearing conditions, this reduction of cock populations will have no effect on 1952 production since it has been demonstrated that ratios as high as 7-10 hens per cock are neither unfavorable nor undesirable.

Submitted by:	Approved by:
Name William R. Bergeson	Montana State Department of Fish and Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

PROJECT NO. 38-R WORK PLAN V JOB NO. V-A

TITLE: RANGE AND DISTRIBUTION OF PRAIRIE GROUSE SPECIES (SHARP-TAILED)

INTRODUCTION:

To date, distribution, relative abundance, and yearly trend data in Montana have been dependent on a walking strip census method, initiated in 1942 and followed through in varying degrees of intensity during the ensuing years. This spring, courtship ground census routes were established in a large part of the known sharp-tailed grouse range, the results being summarized in this report. Thanks are extended to Biologists Brown, Fischer, Whitney and Salinas and deputy game wardens Rogers, Quiring, Gartside, Nicolay, Maloit and Linville for assistance with this work.

PROCEDURE:

The procedure was patterned after that used by Janson (1947) in South Dakota. This consisted of traveling over a 20-mile route, beginning 50 minutes before sunrise, and stopping at one-mile intervals to listen for courtship activity of the grouse. The direction from which this activity was heard, was recorded in degrees of the compass, with the car in an assumed 0 degrees position at each stop.

The routes were selected on the basis of roads which could be traveled during this season, distribution of sharp-tailed grouse as determined from the original 1942 survey, and recommendations by deputy game wardens as to sharp-tailed grouse habitat in their respective districts.

All of the census runs were conducted between April 5th and May 10th. The first courtship activity was noted in Fergus County on March 9th and the last observed on May 30th.

FINDINGS:

Table I shows the number of grounds located and the number of valid listening stops on each route. To give a comparable figure for each route, the number of grounds located has been projected to a figure representing number of grounds/100 stops. Figure I shows the approximate location of each route and the numbers of grounds/100 stops. As this is the first year for this type of inventory in this state, no direct comparisons can be made. The figures do compare in many instances to the relative abundance and distribution data gathered in 1942 (Biennial Report, Montana Fish and Game Department, 1941-1942).

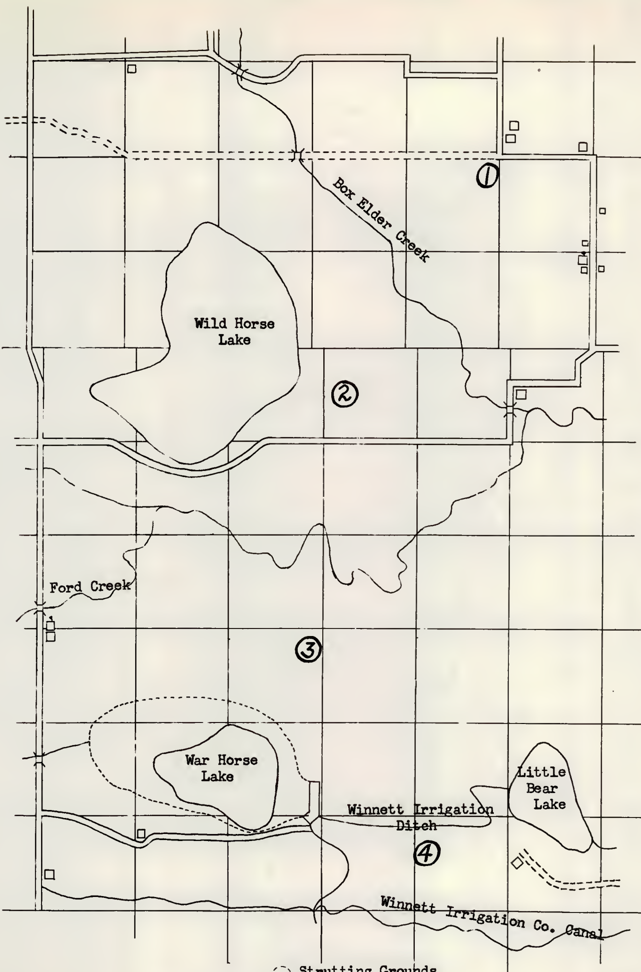


FIGURE I

Portion of trend area given total coverage showing location of sage grouse strutting grounds.

TABLE I

Sharp-tailed Grouse Courtship Ground Census - 1952

County	No. Stops	Grounds/100 stops
Custer	20	35
Daniels	14	29
Dawson	11	27
Fallon	18	28
Fergus I	15	13
II	18	11
III	13	15
IV	17	29
Golden Valley	15	27
Judith Basin	17	12
McCone	20	0
Powder River	21	14
Richland I	12	17
II	8	25
Rosebud I	21	14
II	15	13
Sheridan I	16	31
II	17	18
III	15	35
Sweetgrass	17	24
Wibaux	19	5
Total	339	422
Average	16	20

The number of birds present on each ground counted is shown in Table II. The predominance of males present on the grounds at any one time is evidenced in the counts where sexes were identified. Males were identified by their vigorous activities as were the females by their attitudes of unconcern. It is believed that the proportion of females to males shown here is lower than the actual, as the females were less conspicuous and in some instances were not seen until flushed from the edges of a ground where the cover was more dense.

Five grounds were counted and due to distance from the observer or lack of time while on census run, the birds were not classified as to sex. These counts also suggest the small proportions of females to males on the grounds at one time by the lack of contrast between the averages from the classified and unclassified counts.

TABLE II

Number of Birds/Ground

	No. Classified Males	Birds/Ground Females	No. Unclassified Birds/Ground
	26		
	22	3	17
	16		
	15	2	16
	15		
	12	4	11
	12		
	12		8
	12		
	11	2	7
	11		
	11		
	10	3	
	9		
	9		
	8		
	7		
	6		
	1		
Total	225	14	59
Average	11.8	.7	11.8

CONCLUSIONS AND RECOMMENDATIONS:

Factors to be considered, other than grounds/listening stops, in order to more accurately detect year to year fluctuations, have been discussed by Janson. Of these factors, the writer believes that the number of birds/ground, the effects of wind on the audibility of the hooting and the daily duration of hooting is of prime importance and attempts should be made at standardizing these factors in order that more comparable data between areas and observers be gathered.

Insufficient counts of birds/ground were obtained this spring. Of the grounds counted, there appeared to be a larger number of birds/ground located in areas intersected with mountains in the central portion of the state (11 grounds counted, average 14.6 birds/ground) than in areas of more uniform terrain in the eastern portion of the state (13 grounds counted, average 8.7 birds/ground). Whether or not this difference actually exists, it clearly indicates the need for these counts.

The influence of wind on this type of census has been clearly demonstrated by Janson. Some standard should be arrived at, whereby wind above a certain velocity (believed to be less than 5 mph) would invalidate data from that listening stop.

Daily duration of hooting shows some variance. As much as 45 minutes difference was noted for time of departure on two consecutive days on one ground, the birds seemingly leaving earlier on brighter days. It is suggested that the census route be shortened to 15 stops to better allow complete coverage before cessation of morning activities.

Due to the shortage of qualified personnel for this large area, and the conflicting priorities at the time this work should be done, it is recommended that three trend areas be established, one in the NE, one in the SE and one in the central portion of the state. Intensive work on these areas, i.e., complete and repeated coverage of all roads and counts of all grounds located, should give trend data which could be projected to most of the state. Grange (1948) suggested this method as a "yardstick" to prairie grouse populations for Wisconsin. As many supplemental trend routes should be established between these areas as time and available personnel will allow.

LITERATURE CITED:

Grange, Wallace B. 1948. Wisconsin grouse problems Wisconsin Cons. Dept. Publ. 328, 318 pp.

Janson, Reuel G., Oct. 1, 1947. S.D. Quart. Prog. Rep. Project 17-R-2. pp 23 - 42.

Submitted by Robert L. Eng   Approved by Wm. R. Bergeson

Date July 15, 1952

PROJECT 38-R-3 WORK PLAN NO. V JOB NO. V-B

TITLE: POPULATION TRENDS AND BREEDING POTENTIAL (SAGE GROUSE)

PERSONNEL: Biologists Don L. Brown, Robert L. Eng, Robert J. Fischer. Deputy Game Wardens Asa Rogers, Raleigh Shields, Warren Linville, Jack Nicolay.

PURPOSE:

(1) To determine the total number of male sage grouse on a unit of known size, in an effort to determine over a period of years, the relationship between population fluctuations and strutting ground use on a unit area.

(2) To locate sage grouse strutting grounds throughout the state for use in detecting population trends.

PROCEDURE:

A portion of the trend area (See Montana Quarterly Report 13 (1): 61-64, 1952) was selected for complete coverage by plane in an effort to locate all of the sage grouse strutting grounds on that area. A 54 square mile tract was selected on the basis of its having boundaries readily distinguishable from the air and its proximity to the center of the trend area.

The flight was made over the area on April 21, 1952, from 6:10 until 7:20 A.M. Strips were flown in a north-south direction approximately 3/4 mile apart. An altitude of about 100-150 feet was maintained. Preliminary flights provided assurance that strutting males could easily be seen down sun for one mile with the stiff, white neck feathers providing a sharp contrast to the darker background. The observer looking down sun would keep approximately a ½ mile strip under surveillance, the observer looking up sun, ¼ mile. As strutting grounds were located on the strip, they were plotted on a map of the area.

Following the locating of the strutting grounds from the air, counts were made from the ground of the number of males on each, and the location of each more accurately mapped for future reference.

In addition to the work on the trend area, strutting grounds were located in various counties throughout the state, plotted on county maps and counts made of the number of males on each.

FINDINGS:

Sage grouse were first observed strutting on March 12, 1952, despite a complete snow cover. By March 27, courtship activity had leveled off at a peak with the number of males present remaining quite constant on one ground until May 15th. All counts of males used in this report, unless otherwise designated, were made between March 28th and April 30th. If more than one count was made on any one ground, the highest count made is given.

Four strutting grounds were located on the portion of the trend area given complete coverage. The relationship of these grounds to each other is shown in Figure I and the numbers of males-per-ground are given in Table I.

Table I: Number of Males/Ground on Trend Area (Petroleum County) 1952

Ground No.		No. Males/Ground
1		30
2		12
3		49
4		29
	Total	120
	Average	30

Table II shows the other strutting grounds located with the number of males present on each.

Table II: Sage Grouse Strutting Ground Counts - 1952

County	Ground No.	No. Males/Ground
Custer	1	36
Garfield	1	52
	2	12
	3	35
	4	14
	5	21
	6	28
Golden Valley	1	44
	2	24
Petroleum	5	22
Powder River	1	26
	2	37
	3	17
	4	7
	5	18
	6	13
Total	16	406
Average		25.4

One ground, No. 5 in Petroleum county, was visited six times during the strutting season, the counts and date of each visit being given in Table III. Three of these counts were made in the evening, with such counts showing little deviation from the morning counts. McKean (personal interview) stated that work in Oregon suggested a considerable difference in the number of males present on a ground in the evening and the morning. This point should be given consideration for if the difference were slight or none, it would give additional time for counts where time is at a premium.

Table III: Counts Made on Ground No. 5, Petroleum County - 1952

Date	No. Males Present
March 27	19 (evening)
April 17	22 (evening)
April 22	22 (morning)
April 23	21 (morning)
April 30	21 (morning)
May 15	21 (evening)

DISCUSSION:

Of the 54 square miles given total coverage on the trend area, approximately five square miles were under water, leaving 49 square miles suitable for sage grouse. Girard (1937) in sexing 1881 adult sage grouse found a cock:hen ratio of 50.24:49.76, or approximately 50:50. Projecting this sex ratio to the 120 cocks found on the 49 square miles, a theoretical population is arrived at of 4.9 sage grouse/square mile (120 males plus 120 females/49 square miles). The figure arrived at by the aerial strip count over the entire trend area in March 1952, was 5.6 sage grouse/square mile.

The number of male sage grouse on strutting grounds has been used for trend data since 1941 in Oregon as reported by Batterson (1948). He reported repeated use of the grounds by the birds over the 6 year study period with the exception of the abandonment of some of the smaller grounds in 1947 and 1948, which he attributed to the population lows of 1946. A question which arises regarding the use of random strutting ground counts without a unit area is, to what extent, if any, do the birds move between grounds? Also, what percentage of birds strut singly or in small inconspicuous groups? The writer has observed males performing singly or in pairs. Perhaps these are young males as Batterson reports that most of the breeding is accomplished by a small percentage of older birds on the strutting grounds, with young males being driven to the edges of the grounds.

It is recommended that the aerial winter strip census, strutting ground counts on a unit area, brood counts and road counts over the trend area be continued in conjunction with trapping and banding studies in an effort to evaluate these census methods and better detect sage grouse population fluctuations.

Literature Cited:

Batterson, Wesley M. and William B. Morse, 1948. Oregon sage grouse. Oregon Fauna Series No. 1. Oregon State Game Commission.

Girard, George L. 1937. Life History, habits, and food of the sage grouse, Centrocercus urophasianus Bonaparte. University of Wyoming Publication, Vol. III, No. 1, pp 1-56.

Submitted by Robert L. Eng   Approved by Wm. R. Bergeson

Date July 15, 1952

PROJECT 38-R-3 WORK PLAN NO. V JOB NO. V-C

TITLE: SURVIVAL OF CHUKAR PARTRIDGE RELEASES

PERSONNEL:
Wesley Woodgerd, Wildlife Restoration Division
Robert L. Eng, Wildlife Restoration Division
Wm. R. Bergeson, Wildlife Restoration Division
Orville Lewis, Deputy Game Warden
Emmet Colley, Foreman, Bluewater Hatchery
Fred L. Hartkorn, Wildlife Restoration Division

INTRODUCTION:

During the summer of 1951 all available literature on the chukar partridge was reviewed, and correspondence was conducted with states having successful populations of this bird in order to determine the essential habitat requirements for successful introduction.

It was found that the characteristics of an ideal liberation include the following points:

1. Rocky terrain, moderately covered with grass, weeds and/or shrubs.
2. Moderate to steep slopes broken up by occasional small canyons or ravines.
3. A year-around source of water.
4. Grain or other cultivated crops nearby.
5. An annual precipitation of from 12 - 30 inches with not more than two inches per month coming in May and June.
6. Long periods in winter with little snow on the ground.
7. Average monthly minimum winter temperatures not below 15° - 20° F.; average monthly maximum in summer not over 90° - 95°F.
8. Liberation area accessible by car, but isolated by unfavorable habitat.

An isolated valley with a live stream and rocky slopes and meeting the other points listed above is considered to be an ideal liberation area. The chukar is also believed to be less able to cope with snow than is the Hungarian, thus the liberation of chukars in areas where winter snow on the ground exceeds six to ten inches for long periods is not advisable.

From observations made by Lambeth and Cooney in other states, large quantities of cheat grass (Bromus tectorum) should be present in any proposed liberation area.

Accordingly many proposed liberation sites were inspected and rejected throughout the summer because one or more of the desirable factors listed were not present; however three sites for large scale liberation were selected on the basis of most nearly meeting these rather rigid qualifications, as follows:

1. Ferry Basin, United States Forest Service winter range - Sanders County
2. Bluewater Hatchery Area - Carbon County
3. Black Mountain, Big Hole River Area - Beaverhead and Madison Counties

FINDINGS:

1. Ferry Basin Area - Sanders County

On September 1, 1951, 274 chukars were transported from the Billings Game Farm and released on the Forest Service Winter Range in Ferry Basin, near Perma, Sanders County. Forty-two of these birds were adults and 232 were young, being 11 - 12 weeks old at release time. The release area is characterized by steep, rocky, rounded hills which are covered with native bunch grass, cheat grass and weeds. Most of the gulches and draws are choked with brush and rank weeds (burdock being predominant). Water is present intermittently in most of the gulches. Rock ledges and steep rocky hillsides characterize this area as typical chukar habitat based on reported observations from other states where this bird is present.

These birds tended to remain in a rather compact group near the release site for several days after liberation. They could be heard "talking" much of the time and this behavior seemed to call in stragglers to the main group since on several occasions single birds and/or small groups were observed to fly back to the main group after an exchange of calls.

Twenty dead chukars were found during the first ten days following release, and as far as could be determined these were all young birds. Most of the twenty birds were recovered within a quarter-mile radius of the release point. Where possible, the birds were autopsied. Eight birds were probably killed by predators, of which five were thought to be the prey of hawks and owls. Marsh hawks in the area were observed to attack unsuccessfully both Hungarian partridges and chukars on several occasions. The crops of all dead birds were empty, but gizzard contents of four birds contained mostly cheat grass seeds and some grasshoppers.

After the first week the chukars were observed in groups of twenty to thirty birds scattered to distances of one mile both above and below the release point in the main gulch. As time went on, these groups became smaller and more widely dispersed. By October they became extremely hard to find and intensive coverage of the area with good dogs during October and November revealed very few birds.

During December more extensive checks were made in the area but difficult travel conditions over snow covered terrain eliminated the possibility for intensive searches. Five small groups of chukars totaling about 35 birds were found within five miles of the release point at this time. No dead chukars were found.

Six days were spent in this area in January and six groups of chukars were observed at this time. Although accurate counts are not always possible, it is believed that there were at least 40 birds in the six groups. One group of four was flushed one mile down gulch from the point of release; another group of nine was observed feeding on a rocky point off the main gulch; another group of seven was flushed 1½ miles north of the release site in a side canyon; one group of seven stays near the headquarters buildings and corrals and often come down to feed in the stallion pens; a group of eight was flushed nearly six miles northeast of the release site in a side gulch; and finally a group of five was observed about 10 miles north of the release site in the Camas Prairie area (reported by farmer and verified).

The remains of seven chukars were found, all eaten by hawks or owls; however there was no indication whether these predators had killed the birds, or had found them dead and then consumed them. Two birds were found near a recently used roosting ground and nine chukars were flushed nearby. The other dead birds were found in areas where no chukars were flushed, thus indicating the possibility that other groups were present but not located. Snow depth was about 12 inches, however many bare spots are found beneath overhanging rocks and ledges which contained droppings of either huns or chukars. The presence of roosting spots in the open, dry creek bottoms indicates that either huns or chukars, or both, roost there and where it would seem probable that they would be vulnerable to owl predation. Although Hungarian partridge are common in the area, only two dead huns were found. Very few predators of any kind were noted.

During the first week in February, 10 - 12 chukars were flushed about ½ mile from the original release site in cliffy ledges on the side of the canyon and 8 more were observed along the Flathead River near Perma. On February 22, four birds were observed near the Forest Service headquarters and the remains of a single chukar were found in Ferry Basin.

In March, five days were spent in chukar searches. On March 3 and 4, a group of 15 were observed $\frac{1}{2}$ mile from the release site where the group of 10 - 12 were flushed a month previously; a second group of 7 was found north along the river one mile from Forest Service headquarters, or 3 air miles from the release point. On March 13, one pair was observed along the line fence, but none were found in the north pasture and along the river. On March 21, a well-trained dog failed to find any chukars in the sites favored by these birds throughout the winter.

One search was conducted early in April and dogs were used; only 2 pairs and a single were found near the Forest Service headquarters buildings. At that time, Forest Service personnel reported that several pairs of chukars had been observed during March as far as 10 miles from the release point. On April 29, one pair was observed by the river, and another pair was found on top of the winter range; in addition, a group was reported on the Camas Prairie side of the range.

The latest search in the Ferry Basin area was conducted June 15-21. At that time, a four-man crew searching likely spots in Ferry Basin found 7 adult birds and one brood consisting of 13 young chukars estimated to be ten days old.

2. Bluewater Hatchery Area - Carbon County

On October 8, 1951, 190 young birds were transported from the Billings Game Farm and released in grain stubble in close proximity to Bluewater Creek approximately one-half mile south of the Fish Hatchery. These birds were approximately 16 - 17 weeks old at the time of release. The area is a rather narrow valley flanked by steep cliffs and hillsides topped by a thick layer of sandstone which has eroded and tumbled down; the hillsides are thus littered with large chunks of angular sandstone. These steep, rocky hillsides are covered with bunch grasses, weeds, and shrubs. The principal shrubs found on the hillsides are chokecherry, juniper and scrubby limber pine. Free water is present for at least one-half mile above the hatchery site in Bluewater Creek and the springs forming this stream.

Within ten days after release only 40 birds remained at the liberation site and a rancher living one-half mile above the release point reported seven to ten "birds" of this description in his yard the morning of October 15. A thorough search of the stream banks, and likely terrain plus rancher contacts disclosed no evidence of other chukars in the area. Two dead birds were found along the stream bank both of which were nearly completely devoured. The gizzard of one bird was intact and contained considerable grit, unidentified seeds, and leafy plant material.

On December 4th, the area was again checked and approximately 40 chukars were flushed from the exact area where they had been observed on October 26 in brushy cover along Bluewater Creek. The brush along this stream for a distance of 200 yards on either side of the area from which these birds flushed contained considerable signs of chukar activity such as tracks, dusting spots and droppings.

A rancher located between the Fish Hatchery and the release area has observed 15-20 birds near his ranch buildings which he believes to be chukars. If this is true it may be a distinct group due to the restricted movement of the group at the release area.

Emmet Colley, Foreman of the Blue water Hatchery, observed 47 chukars and 5 pheasants feeding on a thresher sifting pile on November 29th. This pile, which occupied about 25 square feet and was about 12 inches high in the center, consisted mainly of unidentified weed seeds and much sweet clover seed. The birds were observed by Colley for about ten minutes as they fed together without apparent friction.

Further observations on this group of chukars were made January 17, 1952. These birds were again flushed from exactly the same spot as the previous observations along the banks of Bluewater Creek; by this time the sifting pile previously described was reduced to ground level. The chukars flushed as a group and flew rapidly around the shoulder of a side canyon where they disappeared from view. Four observers searched the canyon and the side hills to the top of the rimrock for a distance of one-half mile downstream without finding a single bird of the group estimated to number 40 individuals. While we were hunting a spot to get down from the top of some twenty-feet high cliffs, about midway up the hillside on the far slope of the side canyon toward which the birds had flown, a number of tracks were observed in the trace of fresh snow present. By searching carefully 12 birds were visible below us, and when flushed they came out in two groups totaling approximately 50 birds. Further search disclosed no other birds in the area. Examination of the cliff base from which these birds flushed, showed that this group spends considerable time in this location; one shallow depression formed by a slight overhang from the cliff above was literally covered solid with droppings over an area about five feet long, by one foot wide. Apparently this group feeds along the creek bank and in the sifting pile, then flies to the base of the cliff 300 yards away where they spend considerable time dusting and loafing.

Observations made in February showed at least 50 birds still in the immediate vicinity of the sifting pile along Bluewater Creek. In late March, two chukars were flushed from the strawstack near the sifting pile previously described and tracks of two more were observed.

Inspection of the dusting and resting area at the base of the rimrock in a nearby gulley indicated continued use by these birds. Emmet Colley stated that a rancher downstream from the planting site had "quite a few chukars" around his orchard and strawstacks which suggests a slight movement of approximately one and one-half miles from the planting site.

In April, chukars were heard calling nearly every day by hatchery employees, and a neighboring rancher upstream from the hatchery had observed one or more pairs on four different occasions; however, 8 adult chukars from the Billings Game Farm were released near the hatchery on April 20 and these birds may have contributed to the number of calls heard.

In May, two chukars were observed running along brushy creek cover from a point nearly one-quarter mile away; several hours were spent trying to flush these or additional chukars without success. Birds were heard calling along the rimrocks during late evening and at intervals throughout the day, but extraneous noises prevented any accuracy in determining exact numbers or locations of these birds. One road hill was found approximately one mile northeast of the location where the main group of approximately 50 birds wintered. Twelve loafing and dusting spots were located along the base of the rimrock due west of the release site; all of these resting spots were littered with fibrous droppings. The observers estimated at least 10 pairs of chukars were still present in the area.

The latest search was conducted late in June using a six-man crew and 2 dogs. Only one chukar was found, but contacts with the ranchers on whose land the release was made indicated that several pairs had been observed the preceding week.

3. Black Mountain, Big Hole River Area - Beaverhead and Madison Counties

On September 20, 1951, two hundred, 14-15 week old chukars were transported nearly 300 miles from the Billings Game Farm and released across the Big Hole River from the Bryan Ranch, about midway between Reichle and Ziegler Hot Springs. These birds all flushed from the crates; some flew north into the rocky cliffs by the road, others flew into the tops of large cottonwood trees; and a large number flew south across the river.

The hills on either side of the release area are quite steep and rocky and become nearly vertical cliffs a short distance upstream. Within a quarter-mile radius of the release point along the river bottom are found large greasewood areas, an unharvested oat field, grassy pasture, and alfalfa fields. Although the area is seriously over-grazed, grasses such as bunch grass and buffalo grass are dense among the rock outcroppings and above the lower terrace on Black Mountain which is generally inaccessible to livestock. Common shrubs are juniper, mahogany brush, sagebrush, and greasewood.

Feed was scattered around the release area and this tended to hold the birds together since Orville Lewis, Deputy Game Warden, found most of this release bunched up into flocks of about 30 birds each, all within 30 yards of the release point, on September 30, ten days following liberation. He also found three dead birds and he believed they were feeding on weed seed.

On October 4, approximately 100 birds were flushed from an unharvested oat field directly across the river from the release point.

On October 8, the oat field and cliffs on both sides of the river were searched and no birds were found; however, many droppings, molted feathers, and dust baths were noted along an irrigation ditch between the oat field and the river, and in the oat field proper.

On October 21, several small groups of chukars were observed moving out from the irrigation ditch mentioned above and flying up to the rocky slopes on the south side of the river. Two large groups and several singles, totaling 71 birds, were flushed from the side hill and all flew about 500 yards, landing near the head of coulee on a steep, rocky slope. Men at the Bryan Ranch stated that the birds were seen quite regularly and a group of 12 were observed each morning near the house. They also stated that a pair of golden eagles appear to be working the release area daily.

On November 6 the area where the birds were last seen was again searched without locating any chukars. An interview with Mr. Bryan disclosed that on November 30, approximately 50 birds were observed by him just before dark moving from the sidehills into the thickets along the irrigation ditch and river, where last observed.

On January 4, 1952, two observers searched the area south of the river across from the release point without finding any chukars or fresh signs of these birds. About 3 inches of snow, which had fallen three days before, was present in the area. A contact with Mr. Bryan disclosed that no chukars had been observed by him since November 30.

A report was received by Warden Orville Lewis that chukars had been inhabiting a feed lot area on the Ferris Ranch, located seven air-miles due south of the release site. An interview with Ferris yielded the following information:

Thirty to forty birds comprising one flock were first noted during the week preceding October 12. They were observed about a livestock feeding area and appeared quite tame. They were noted regularly until the opening of the pheasant season; thereafter they were seen less regularly and seemed more dispersed. They were last observed in the area about December 20th.

This area was searched by two observers and a dog on January 4 and 5; two covies of Hungarian partridges, but no chukars were observed.

On January 14 and 15, four observers searched the entire release area and immediate surroundings, the canyon walls upstream from the release site, and the entire southeast exposure of Black Mountain from the Big Hole River to its southwest end approximately one mile from U.S. #91, an area of about two and one-half square miles. In addition, likely looking places on the northwest slope of Black Mountain were checked.

On January 14th, recent signs of their activity consisting of excavations around the basal leaves and roots of bunch grass clumps as well as droppings, and several feathers subsequently identified as chukar, were found on top of high ridges on either side of the river, but no birds were observed on either day. Patches of snow in shaded spots and shallow drifts on the lee side of sage brush was all the snow present on January 14; however, about 4 inches of new snow fell the following morning.

Predators are numerous in the area, particularly on Black Mountain. One active bobcat den was found in addition to bobcat tracks generally distributed over the entire area. Goshawks and a Coopers hawk were noted as well as a single duck hawk two miles below the release point. Three golden eagles were noted from the highway and about one mile west of Black Mountain.

Periodic searches have been conducted through June in the immediate areas adjacent to the release site, and in favorable-appearing sites within a five-mile radius, but no trace of this chukar release has been found since mid-January.

Persistent rumors concerning the presence of chukars on the south slopes of McCartney Mountain were investigated and found to have little basis since the ranchers making these reports had them at second and third-hand from riders who were apparently confusing chukars with Huns.

From conversations with chukar workers in other states, it would appear that this site is particularly deficient in cheatgrass, as well as the other grass types which provide a large proportion of the chukar's diet. Accordingly, it is probable that these birds moved out to parts unknown and either did not survive the process, or are present but undetected in some new location.

ADDITIONAL NOTES:

Following a severe blizzard in northeastern Montana on February 16, a group of 8 - 10 chukars drifted in to the Fort Peck Game Farm and remained in the vicinity for approximately a week. Apparently, this same bunch was noted during severely cold weather along the Glasgow-Fort Peck Highway on two mornings by Deputy Game Warden Quiring of Plentywood. Where these birds came from is a complete mystery since the only record of a chukar release in that area was in 1944 when an unknown number of these birds were released. Where these birds drifted following these observations is also unknown.

On June 8, 1952 a total of 81 adult chukars were released on the Hannon ranch three miles north of Fly Inn about midway between Billings and Hardin. On June 23-24, two weeks later, a six-man crew with dogs combed the area and found 23 chukars and the remains of two dead birds.

SUMMARY AND CONCLUSIONS:

Forty-two adults and 622 young chukar partridges from the Billings Game Farm were released during Spetember and early October in three areas: 1) Ferry Basin, near Perma; 2) Bluewater Hatchery, near Fromberg; and 3) Big Hole River, east of Reichle. In addition, 8 surplus breeders from Billings were released April 20 at Bluewater, and 81 adult chukars from the same game farm were released June 8, 1952 on the Hannon Ranch midway between Billings and Hardin. The total releases between September 1951 and July 1952 therefore were 753 birds.

Frequent checks made in each area following release disclosed that: 1) the birds dispersed rather slowly becoming increasingly difficult to find within a mile or two of the release points, and 2) there was probably heavy initial mortality of the young birds at each release point because at the Ferry Basin site, 20 dead birds were found during the first month. This would be a bare minimum since, obviously, it is impossible to find all dead birds.

The fact that the remains of 7 chukars were found at Ferry Basin during January while only two dead huns were found--although huns are common in the area--would tend to indicate that chukars are comparatively vulnerable to severe winter conditions and/or avian predation.

Occasional checks made through December disclosed 35-60 birds present in Ferry Basin; approximately 45 birds were observed each time at Bluewater; and 50-70 chukars were observed at the Big Hole site through November 30. However, no birds have been found there since that time.

By February, the Perma group had dispersed to the point where only about 20 birds could be found, while the Bluewater group remained intact. From March through June only occasional pairs could be found, indicating a probable complete dispersal of surviving birds at the approach of the mating season.

A brood consisting of an adult chukar and 13 young was found at Ferry Basin on June 18, thus lending some encouragement to the hopes for chukar success in western Montana, at least.

As a result of cursory inspection of chukar habitat in eastern Washington in May, 1952, and from conversations with chukar workers from other western states at the Western Commissioners Conference in June, it is apparent that Montana does not have an abundance of ideal chukar habitat, as formerly presumed. We have large expanses of cheatgrass, as well as other areas which are rocky and precipitous; however, few areas combine both features in desirable proportions.

No conclusions can be drawn concerning the ultimate success of the chukar in Montana; however, it is encouraging to find that apparently only one plant (the Big Hole area) was a complete failure and that at least one brood was brought off successfully at Perma.

Submitted by:	Approved by:
Name Wm. R. Bergeson	Montana State Department of Fish & Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

STATE	Montana
PROJECT	39-R-3
DATE	July 15, 1952
VOL.	III NO. II

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required by

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Waterfowl Survey and Investigation

2. Leader: Wynn G. Freeman, Waterfowl Biologist

3. Report of Progress:

Work Plan I:

Job 1-A: Aerial Waterfowl Census

The annual breeding ground aerial census transects were flown during the report period. This census is designed to determine the annual trend in numbers of breeding waterfowl. The comparative data secured this spring will be incorporated in a breeding ground report and submitted at a later date.

Job 1-B: Ground Waterfowl Census

Selected roadside transects were covered during the report period. The species composition of waterfowl and the production of broods are determined by this ground census. These data will also be included in the forthcoming breeding ground report.

Work Plan II: Waterfowl Movements and Migration Study

A job completion report was submitted last quarter. This report pertained to winter-banded mallards.

At present, project personnel are engaged in a cooperative effort to band Canada geese. United States Fish and Wildlife Service furnish the power boats and part of the manpower; the state waterfowl project provided the remaining personnel. It is planned that the banding will be done on four areas this year: Meadow Lake at Ennis, Lima Reservoir near Lima, Bowdoin Federal Refuge at Malta and Lower Flathead Lake near Polson. To date, 59 geese were banded at Meadow Lake in contrast to 199 last summer.

Work Plan III: Study of Relationship of Stock Water Reservoirs to Waterfowl Production

A progress report was submitted in the January, 1952 quarterly report.

A job completion report of this three-year study will be submitted at a later date. Richard Smith visited all reservoirs this spring to record breeding waterfowl data.

Work Plan IV: Study of Census Method and Ecology of Waterfowl in Flathead Valley.

A job completion report is scheduled for the January quarterly.

Ground and aerial censuses were again conducted during May. These provide both a trend of the breeding population and additional data for evaluation of census methods.

Work Plan V: Pre-acquisition Study of Freezout Lake

A job completion report was submitted last quarter. During the report period, study has been continued by LeRoy Ellig. Special emphasis is being placed upon study of nest predation. Abnormally low nesting success, interrelated with overgrazing, is an important limitation of waterfowl production on this area.

Work Plan VI: Pre-acquisition Study of Muddy Creek Area

Inactive during report period.

Work Plan VII: Pablo Refuge Management Investigation

We planned to band a good number of non-breeding Canada geese on Pablo Reservoir this year. The area was censused periodically with the aid of refuge manager Grover Elgren. However, the geese have failed to appear here in sufficient numbers to warrant an extensive banding operation.

Work Plan VIII: Blackfoot-Clearwater Habitat Development

Inactive during report period.

Work Plan IX: Sun River Habitat Investigations on State Lands

Inactive during report period.

Work Plan X: Investigation of Potential Waterfowl Habitat

Progress report attached.

Work Plan XI: Study of Hunter Utilization

A job completion report was submitted last quarter. Work plans were inactive with exception of further analysis of field data and submission of three reports to the Pacific Flyway Study Committee.

Submitted by:	Approved by:
Name Wynn G. Freeman	Montana State Department of Fish and Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

PROJECT: 39-R-3 WORK PLAN NO. X

TITLE: INVESTIGATION OF POTENTIAL WATERFOWL HABITAT

OBJECTIVES:

The investigation of areas for possible waterfowl development, such as: Chain-o-Lakes, Browns Lake, Women's Pocket.

PROCEDURE:

During other routine work, information will be obtained concerning the feasibility of the habitat development on the various areas in the state.

The Chain-o-Lakes coulee near Havre received some preliminary investigation this quarter.

FINDINGS:

In mid-June a brief survey was made with the department engineer, C. K. Dalton. A feasible pumping site was located at a point on the south shore of Fresno reservoir. A ditch line was surveyed from the pump site to the highest elevation in the floor of Chain-o-Lakes Coulee. A good 20 feet contour map was secured from the U. S. Reclamation Service at Malta. Water elevation records were secured from the U. S. Reclamation Service at Havre. Other planning data has been filed.

The Chain-o-Lakes Coulee contains a series of small, flat-bottomed lake basins of the shallow prairie pothole type. Each basin appears to be potentially a fine waterfowl area.

The spring runoff in the Hi-line region was extremely unusual. In 1951 there were approximately 80 surface acres in the coulee. This was increased by about 500 additional surface acres in 1952. Approximately 100 breeding ducks were observed June 1, 1951. Nearly 800 ducks were using the area in May 1952.

CONCLUSION:

Chain-o-Lakes holds much promise for waterfowl habitat development, if water can be pumped into it from Fresno reservoir economically. Further survey of this area will include the following: refinement of the water supply route; plan of water distribution and control in the several lakes, and an estimate of the total costs of the project.

It is planned to continue the survey July 21 with C. K. Dalton and a Regional Office engineer participating.

Submitted by:	Approved by:
Name Wynn G. Freeman	Montana State Department of Fish and Game
Gerald Salinas	By: Robert F. Cooney, Director
Date July 15, 1952	Wildlife Restoration Division

STATE Montana
PROJECT NO. 49-R-1
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required by

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Fur Resources Survey and Investigation

2. Leader: Fletcher E. Newby, Jr. Biologist

3. Report of Progress:

WORK PLAN NO. I JOB NO. I

TITLE: SURVEY OF FUR ANIMAL DISTRIBUTION AND HABITAT

Investigation of wolverine distribution and occurrence based on sight and capture records was completed. Drafting of a distribution map is underway and a completion report will appear in the next Quarterly Report.

An intensive study of the effect of otter feeding on fish and fur animal populations was undertaken during the quarter. An advanced student from Montana State College, Kenneth R. Greer, was assigned to the intensive portion of the study in Lincoln County. Field work is proceeding according to schedule. More than 600 otter scats have been collected, many of which can be assigned to a specific period so that seasonal changes in the diet may be detected. Collection of a series of animals of known identity which may be potential or known items in the otter diet was begun to aid in the identification of remains in the droppings. Information concerning the composition of fish populations in the various study areas was also gathered. Direct observations of otter have been made in a few instances.

Additional reports of areas where marten once occurred and where suitable habitat is still present were obtained during the quarter. It is expected that these areas will be closely investigated with the aim of evaluating them as future transplant sites.

WORK PLAN NO. I JOB NO. II

TITLE: FUR RESOURCE INVENTORY

Collection of information on annual yield and income to the trapper from the fur resource, based on fur dealers' records and shipping permits, was completed and is summarized in Tables I and II. The information obtained was not regarded as reliable at the county level; therefore, the state was divided into eight districts of several counties each (see Figure 1). While this division was chiefly arbitrary, an attempt was made to group counties having similar characteristics. A completion report on this phase will appear in the next Quarterly Report.

Trapper catch report cards were sent to all the 1350 licensed trappers in the state after the close of the season, April 15. A return of 53 per cent of these cards has been obtained to date. One hundred ten of the 720 trappers reporting did not trap. Comments and, in many cases, lengthy letters were received from 198 trappers.

Submitted by:	Approved by:
Name Fletcher E. Newby	Montana State Department of Fish and Game
Title Junior Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

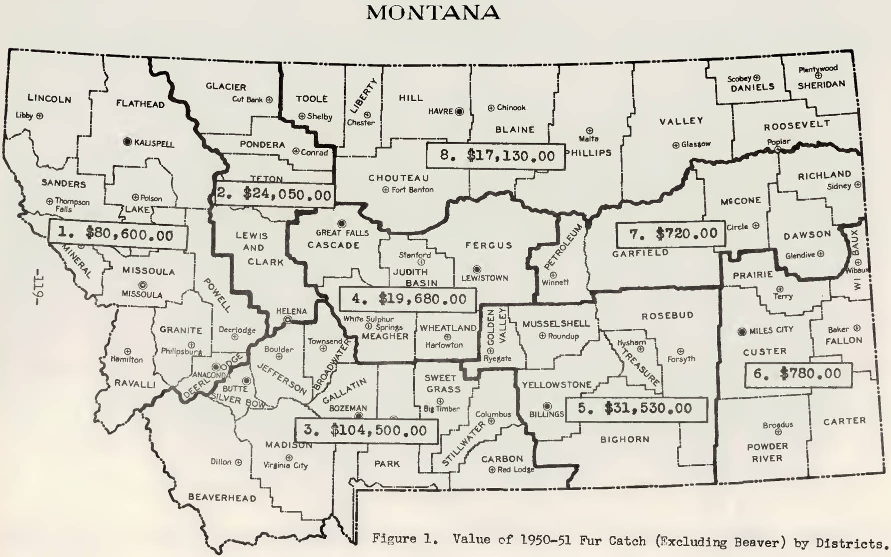


Figure 1. Value of 1950-51 Fur Catch (Excluding Beaver) by Districts.

TABLE I

ANNUAL YIELD & VALUE OF 1950-51 FUR CATCH

	1		2		3		4		5		6		7		8		MONTANA			
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	% of Total Pelts	Value	% of Total Value
Muskrat	14,863	$25,560.00	5,293	$ 8,260.00	16,604	$ 26,730.00	3,475	$ 4,800.00	8,623	$12,940.00	23	$ 35.00	321	$510.00	4,041	$ 5,010.00	53,248	67.30	$ 83,800.00	17.60
Mink	1,908	36,290.00	745	14,440.00	3,610	65,800.00	772	14,530.00	862	17,850.00	34	640.00	7	130.00	652	11,800.00	8,590	10.90	161,500.00	33.80
Marten	863	18,240.00	34	860.00	565	10,310.00	——	——	——	——	——	——	——	——	——	——	1,462	1.80	29,410.00	6.20
Weasel	399	400.00	173	220.00	679	820.00	145	190.00	130	150.00	2	1.50	11	13.00	93	120.00	1,632	2.10	1,910.00	.40
Bobcat	35	70.00	90	180.00	131	270.00	31	65.00	96	200.00	29	60.00	19	39.00	30	60.00	461	.60	940.00	.20
Coyote	17	20.00	9	11.00	23	30.00	16	20.00	70	90.00	——	——	——	——	12	15.00	147	.20	190.00	.04
Skunk	2	2.00	82	75.00	329	300.00	80	70.00	106	100.00	31	28.00	24	20.00	118	110.00	772	1.00	710.00	.20
Raccoon	——	——	——	——	11	12.00	——	——	175	190.00	6	6.50	3	3.00	——	——	195	.20	210.00	.04
Badger	5	4.50	1	1.50	2	1.50	7	6.00	10	9.00	9	7.50	3	2.50	3	1.00	40	.06	35.00	.01
Fox	12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	21	..04	45.00	.01
Lynx	1	10.00	——	——	——	——	——	——	——	——	——	——	——	——	1	14.00	2	——	25.00	——
Wolverine	5	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
TOTALS	18,087	$80,600.00	6,437	$24,050.00	21,962	$104,500.00	4,526	$19,680.00	10,056	$31,530.00	134	$780.00	444	$720.00	4,950	$17,130.00	66,570		$279,000.00	
Per Cent of Total Other Than Beaver	27.2	28.9	9.7	8.6	32.9	37.4	6.8	7.1	15.1	11.1	0.2	0.3	0.7	0.3	7.4	6.1				
																Beaver TOTAL	12,522 79,092	15.80 100.00	$198,000.00 $477,000.00	41.5 100.00

TABLE II

AVERAGE FUR PRICES — DISTRICT AND STATE-WIDE
1950-51 SEASON

	1	2	3	4	5	6	7	8	MONTANA
Muskrats	1.72	1.56	1.61	1.38	1.50	**	**	1.24	1.58
Mink	19.02	19.38	18.22	18.82	20.71	**	**	18.10	18.79
Marten	21.14	**	18.25	*	*	*	*	*	20.23
Weasels	1.00	1.28	1.21	1.33	**	**	**	1.25	1.18
Bobcat	**	2.31	2.21	**	**	**	**	**	2.05
Coyote	**	**	**	**	**	*	*	**	1.30
Skunk	**	.80	1.09	**	**	**	**	.85	.91
Raccoon	*	*	**	*	**	**	**	*	1.07
Badger	**	**	**	**	**	**	**	**	.85
Red Fox	**	**	**	*	*	*	*	*	2.09
Beaver	16.86	15.23	16.94	15.20	15.98	11.49	16.71	13.43	15.83

* - None were caught in the district.

** - State-wide average used; district sample insufficient to obtain accurate average.

STATE Montana
PROJECT 27-D
DATE July 15, 1952
VOL. III NO. II

FINAL PROJECT REPORT

FOR

DEVELOPMENT

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

Date: July 1, 1951 - June 30, 1952

1. Title of Project: Sun River Winter Elk Range Development

2. Personnel: Bruce Neal, Unit Manager
Robert Neal, Fieldman, Assistant
Dave Stonehouse, Laborer

3. Development Work:

1. One and one-half miles of new fence was constructed on the Willow Creek holdings. This fence is a crotch fence with five wires. Every tenth crotch is anchored by a deadman to keep the fence from collapsing in case of a break in the wire.

2. A short drift fence was constructed at the mouth of Hannan Gulch just to the north of the range. This is a fence made entirely of poles approximately six feet high with seven poles. The purpose of this is to drift the elk across Sun River and onto the winter range.

3. A horse pasture was set up at the headquarters station. This is a crotch fence with four wires.

4. A garage and shop were provided at the headquarters. A log building was moved in from farther north on the range. It was set up and remodled. Completed, it is approximately 18 by 40 feet. The purpose of the structure is to have a place to store the truck during cold weather and also for a store room for tools and supplies. It has a concrete floor and shingle roof.

5. A bathroom was installed in the headquarters station. Also some remodeling was done on the interior of the house.

6. Several small bridges were built across the creeks within the range. These bridges are made of logs for stringer and poles for tops.

Submitted by:	Approved by:
Name Robert Neal	Montana State Department of Fish and Game
Title Asst. Game Range	By Robert F. Cooney, Director
Manager	Wildlife Restoration Division
	Date July 15, 1952

STATE Montana

PROJECT 33-D

DATE July 1, 1952

FINAL PROJECT REPORT
FOR
DEVELOPMENT

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Blackfoot-Clearwater Development Projects

2. Personnel: Stan Mongrain, Project Leader
Jack Ray, Jr. Fieldman
Other temporary help as needed.

3. Report of Projects Completed:

1. Fence Construction

A drift fence was constructed along the east side of the Seeley Lake road. Materials used in constructing this fence were steel posts, one rod apart, with treated wood posts for anchors every twenty rods. Three barbed wires, the first was twenty-six inches from the ground with the remaining two wires twelve inches apart, were used. This made an adequate drift fence keeping out trespass stock. This fence is 2.9 miles long.

2. Truck Trail Construction

A major part of the fall and winter projects were to be carried on to the north and west of the hay meadows. In order to prevent damage to the meadows by snow plowing equipment and trucks, a truck trail was cleared along the west edge of the meadowland. Part of the trail clearing consisted of removing stumps and down timber with little or no grading. An old railroad grade was used for the remainder of the trail by removing the old ties that had been left on the grade. Total mileage for the truck trail is 2 1/8 miles.

3. Portable Elk Trap Construction

Three complete portable traps were built at the Blackfoot-Clearwater Headquarters last winter. The material for the first trap was furnished by the Western Montana Fish and Game Association. This trap is to be used in Western Montana by Department personnel. The other two traps are to be used in the Blackfoot, Sun River, and the Gallatin areas.

The traps were built of rough sawed lumber. With the exception of the gate frames, all the material was 1 x 6 - 16 ft. long and 1 x 6 - 14 ft. long. The gate frames were made of 6 x 6 - 9 ft. for uprights and 2 x 6 - 9 ft. long with cross ties. The panels made from the one by six are 9 ft. high and 7 ft. wide. The gate frames are 9 ft. high and 7 1/2 ft. wide. The gates are 7 ft. square.

These traps are to be used in assisting in migration studies. By tagging mature animals on their winter range, fall and spring migration patterns can be established.

4. Garage Construction

A 20' by 26' two stall garage has been completed at Headquarters. The building is of lumber frame construction with 6" rustic lumber siding and galvanized metal roof.

5. Experimental Feed Pen Construction

The Blackfoot-Clearwater Range Unit was selected as the site for a set of pens to be used in winter feed studies of big game. Assistance was given the Cooperative Research Unit in planning, selection of materials, and in the supervision of the actual construction of the pens. Department owned equipment was loaned to the Unit during the building of the pens. Students from Montana State University made up the construction crew.

Submitted by:	Approved by:
Name Stan Mongrain	Montana State Department of Fish and Game
Title Project Leader	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

STATE Montana
PROJECT NO. 43-D
DATE July 15, 1952
VOL. III NO. II

QUARTERLY PROGRESS REPORT FOR

DEVELOPMENT PROJECTS

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title of Project: Judith River Game Range Development

2. Leader: Jack Owens

3. Report of Progress:

BUILDING REPAIR:

The main Noel residence is considered a headquarters building. Necessary repairs as listed in original Plans, Specifications and Estimates have been completed. The building has been covered with two coats of paint and shingle stain.

The old Sutter cabin, originally used as a headquarters, has been moved adjacent to the above house and is remodeled into a garage and shop. It has a concrete floor, has had roof repaired and painted as above.

The remaining buildings have also been painted.

The pump house has been repaired and painted and the pump motor and jack installed.

FENCING:

About two miles of the proposed fence has been constructed. The cattle guards will be installed as soon as easements have been obtained from the Sapphire Mining Syndicate. These have been promised.

PLANTING:

The grass seeding on the crop land was completed in May.

MISCELLANEOUS:

Several old buildings were removed and salvaged or moved to the headquarters site. Some interior fence and the boundary fence that has been replaced by new fence, have been removed.

A truck has been ordered for this project but delivery has been slow.

Submitted by:

Name Faye M. Couey

Title Sr. Biologist

Approved by:

Montana State Department of Fish & Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1952

STATE Montana
PROJECT NO. 26-M
DATE July 15, 1952
VOL. III NO. II

FINAL REPORT FOR MAINTENANCE PROJECT

As Required by

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Game Range Maintenance Through Salt Distribution

2. Leader and Personnel: Lloyd E. McDowell, Biologist
Dwight Stockstad, Student Assistant
George Scott, Western Montana Fish and Game Assn.
M. J. Watt, Deputy Game Warden
Four pilots from Johnson Flying Service

3. Dates: Salt was distributed by air during the last two weeks in May, 1952. Remainder was distributed to Ranger Stations and will be distributed during the summer by other methods.

4. Purpose: The primary objective of this work is to release grazing pressure by big game on winter range during late spring and early summer. Mineral salt was used to supply essential minerals in areas where deficiencies occur.

5. Procedure: Block salt is delivered to the nearest town by railroad and then trucked to the closest airports or ranger stations. A tri-motor Ford plane, which is capable of carrying 3000 pounds in one load, is used to distribute the salt to the more inaccessible areas. A smaller plane was used on a number of occasions when amounts to be dropped were small in one area.

The salt delivered to the ranger stations was put out by pick-up trucks, jeeps, and pack horses.

Routes and areas salted were the same as those set up in Rognrud's report - Wildlife Restoration Quarterly, July-September 1950. A number of new areas were added to this last year. Maps showing these routes and plans are on file at the Helena office and at the Missoula headquarters.

All the salt shown in the following table was dropped by a Ford tri-motor plane rented from the Johnson Flying Service at Missoula, Montana at $90 per hour.

DATE (1952)	TIME Hrs.	 Min.	AREA*	COST (@ $90 per hr.)
May 21	1	25	Lower Blackfoot	$127.50
May 22	6	35	Sun River (4 trips)	592.50
May 23	2	20	South Fork of Flathead (upper)	210.00
May 23	3	20	Plains-Thompson Falls	300.00
May 24	2	10	South Fork (White River & vicinity)	195.00
May 24	1	20	Seeley Lake area	120.00
May 24	1	30	Fish Creek (Deer Peak)	135.00
May 26	5	25	Bitterroot (4 trips)	487.50
May 27	7	25	Kalispell (5 trips)	667.50
May 28	3	15	Flint Range (2 trips)	292.50
May 28	1	45	Local (3 trips)	157.50
June 3	3		Schafer-Big Prairie Holbrook-Black Bear	270.00

Total time 39 hours 30 minutes Total Cost $3555.00

*See maps on file at headquarters for complete route of flights

Submitted by:	Approved by:
Name Lloyd E. McDowell	Montana State Department of Fish and Game
Title Biologist	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

STATE Montana
PROJECT 45-M
DATE July 1, 1952
VOL. III NO. II

FINAL PROJECT REPORT

FOR

MAINTENANCE

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

1. Title: Blackfoot-Clearwater Maintenance Project

2. Personnel: Stan Mongrain, Project Leader
   Jack Ray, Junior Fieldman
   Other temporary help as needed.

3. Report of Progress:

1. Headgate Repair

After the irrigation water was shut off the hay meadows, some repair work was necessary on the headgates and ditches. Some of the work was finished in the fall. The repairs consisted of replacing broken head boards and patching leaks in the headgates. This spring the ditches had to be cleaned of leaves and branches that accumulated during the fall and winter. Spring run off water causes washouts along the ditch banks that must be repaired before irrigation time.

2. Winter Wood Supply

Each fall enough wood must be cut to last for one year. This amounts to approximately fifty cord. It takes three men three weeks to cut, split, and haul this amount of wood.

3. Building Repair

Galvanized tin roofing was used to replace the old cedar shingles on the shop at Headquarters. The roofing was salvaged from an old sheep shed.

4. Elk Feed Lines

A short feed line was necessary this past winter to help move onto and hold the elk on Department owned range. A feed line was also used to lure the elk into an area where it was possible to trap and tag them.

These lines were maintained by two men with a team of horses and a sleigh.

5. Snow Removal and Road Maintenance

During the trapping period the snow was removed from the trapping site with a rented bulldozer.

The roads into headquarters, to the Experimental Feeding Pens, and the trapping sites had to be plowed after each storm. A total of seventy hours was used in snow plowing.

6. Fence Repair and Removal of Trespass Stock

The outside perimeter fences of the Blackfoot-Clearwater range were inspected and repaired this spring. High wind and heavy snow does most of the damage. Stray range stock damage the fences and also graze over some of the vital winter range that is available to elk during critical periods. An effort is made to protect this range by continuous herding of the stock onto areas less important.

7. Bridge Repair

Several small bridges crossing the irrigation ditches in the hay meadow had to be repaired this spring. Heavy loads crossing them when the ditch banks were soft pushed the bridges into the ditch. The planking was taken up and new stringers put in on plank headers. The original planking was used for the decks.

Submitted by:	Approved by:
Name Stan Mongrain	Montana State Department of Fish and Game
Title Project Leader	By Robert F. Cooney, Director
	Wildlife Restoration Division
	Date July 15, 1952

STATE Montana
PROJECT 47-M
DATE July 15, 1952
VOL. III NO. II

FINAL PROJECT REPORT

FOR

MAINTENANCE

As Required By

FEDERAL AID IN FISH AND WILDLIFE RESTORATION ACTS

Date: July 1, 1951 - June 30, 1952

1. Title of Project: Maintenance of Sun River Winter Elk Range

2. Personnel: Bruce Neal, Unit Manager
Robert Neal, Fieldman, Assistant
Dave Stonehouse, Laborer

3. Maintenance work:

1. Approximately three miles of boundary fence was set up. This was due to wind damage. Four hundred stakes were driven to serve as side anchors on the exposed areas to attempt to stop wind damage.

2. A drift fence in Beaver Creek was repaired. The purpose of this fence is to help drift the elk to the winter range.

3. A trip was made to Ovando to get an old grader, and the roads leading to the headquarters were graded. The work accomplished by this grader is somewhat limited as it is an old horse drawn type and does not have enough weight to handle heavy maintenance work.

MISCELLANEOUS

1. Approximately eighty tons of hay harvested on the range on a share-crop basis were hauled in and stacked.

2. Wood was hauled and sawed for four camps for winter patrol work.

3. Three pole gates were constructed and put up for corrals.

4. Three old buildings were removed.

5. One old fence was removed around the recently acquired Swazie unit.

6. Some time was spent hauling lumber for stack fencing.

7. Salt was hauled for salting programs on the range.

8. Eleven miles of fire guard was maintained.

PATROL WORK

1. Approximately four and one half months were spent on elk distribution patrol. The purpose of this is to drift the elk from private land on to the game range and hold them there during the winter period.

2. Considerable time was spent on fire patrol during critical periods.

3. A limited amount of patrol was necessary during hunting season on adjoining areas.

4. Several days were spent on stray stock patrol.

Submitted by:	Approved by:
Name Robert Neal	Montana State Department of Fish and Game
Title Asst. Game Range	By Robert F. Cooney, Director
Manager, Sun River Unit	Wildlife Restoration Division
	Date July 15, 1952